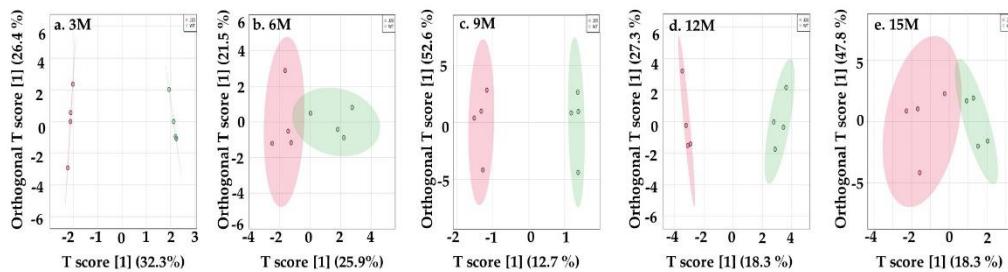


Supplemental Figure

A. OPLS-DA analysis



B. PCA analysis

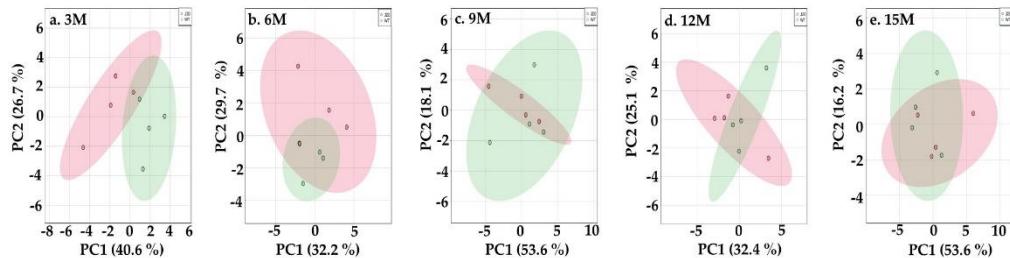
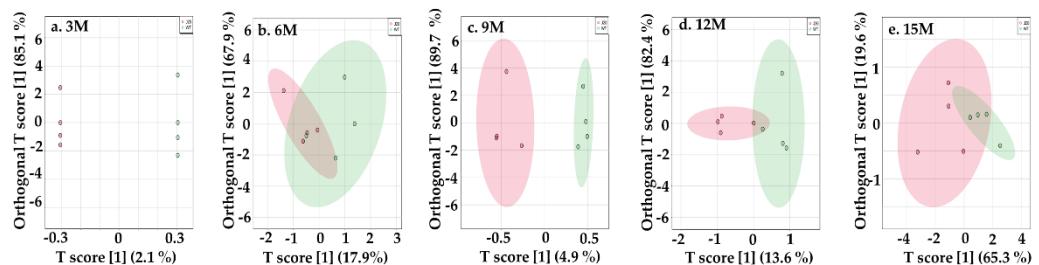


Figure S1: Orthogonal partial least square discriminant analysis (OPLS-DA) and principal component analysis (PCA) of Pls-PC in the J20 and WT mice. Four mice were used in each group for J20 and WT mice at each time point. OPLS-DA analysis (A) at 3M (A.a), 6M (A.b), 9M (A.c), 12M (A.d), 15M (A.e), and PCA analysis (B) at 3M (B.a), 6M (B.b), 9M (B.c), 12M (B.d), 15M (B.e) were conducted with the measured Pls-PC by using MetaboAnalyst 5.0 software. Pink-colored circles indicate Pls-PC distribution in J20 mice, and green-colored circles indicate Pls-PC distribution in WT mice. M indicates months.

A. OPLS-DA analysis



B. PCA analysis

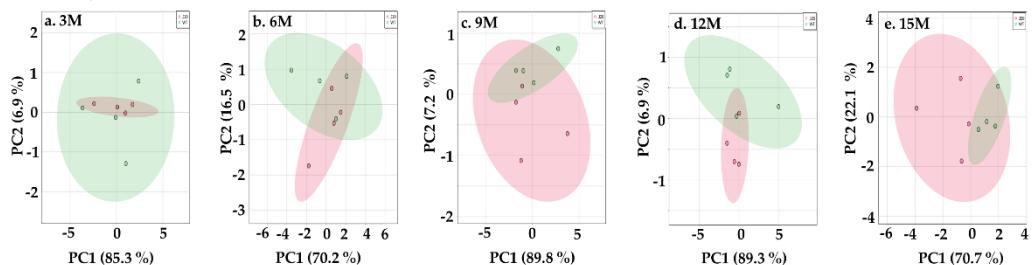


Figure S2: Orthogonal partial least square discriminant analysis (OPLS-DA) and principal component analysis (PCA) of the alkyl-acyl-PC in the J20 and WT mice. Four mice were used in each group for J20 and WT mice at each time point. OPLS-DA analysis (A) at 3M (A.a), 6M (A.b), 9M (A.c), 12M (A.d),

15M (A.e), and PCA analysis (B) at 3M (B.a), 6M (B.b), 9M (B.c), 12M (B.d), 15M (B.e) were conducted with the measured alkyl-acyl-PC by using MetaboAnalyst 5.0 software. Pink-colored circles indicate alkyl-acyl-PC distribution in J20 mice, and green-colored circles indicate alkyl-acyl-PC distribution in WT mice. M indicates months.

Supplemental Table

Table S1. PIs-PE and alkyl-acyl-PE molecular species concentration (pmol/mg (\pm SD)) in the hippocampus of wild-type and J20 mice.

| Lipid Name | m/z | Molecular Species | WT. (\pm SD) | 3M | | 6M | | 9M | | 12M | | 15M | |
|-------------|-----|-------------------|-------------------|-----------------------------|-------------------|------------------------------|-------------------|------------------------------|-------------------|------------------------------|--------------------|------------------------------|----------------|
| | | | | J20 (\pm SD) | WT (\pm SD) | J20 (\pm SD) | WT (\pm SD) | J20 (\pm SD) | WT (\pm SD) | J20 (\pm SD) | WT (\pm SD) | J20 (\pm SD) | WT (\pm SD) |
| PE (P-34:1) | 701 | P-18:0/16:1 | 1.22 (0.32) | 0.95 (0.38) | 1.02 (0.32) | 0.79 (0.27) | 0.77 (0.26) | 1.18 (0.69) | 0.78 (0.41) | 0.87 (0.22) | 1.55 (0.35) | 0.84 ^b (0.17) | |
| | | P-16:0/18:1 | 13.32 (3.46) | 14.01 (5.61) | 11.37 (3.62) | 9.94 (3.41) | 9.46 (3.21) | 15.12 (8.87) | 10.10 (5.25) | 10.18 (2.59) | 18.29 (4.10) | 10.70 ^b (2.19) | |
| PE (P-34:0) | 699 | P-18:0/16:0 | 23.27 (9.23) | 25.64 (6.71) | 20.42 (3.64) | 21.36 (3.98) | 17.23 (5.97) | 27.83 (12.24) | 22.95 (6.47) | 20.57 (5.73) | 30.65 (8.39) | 20.15 ^a (4.30) | |
| | | P-16:0/18:0 | 1.34 (0.53) | 2.63 ^a (0.69) | 1.05 (0.19) | 1.58 ^a (0.29) | 1.69 (0.59) | 2.16 (0.95) | 2.10 (0.59) | 1.80 (0.50) | 2.75 (0.75) | 1.95 (0.42) | |
| PE (P-36:4) | 723 | P-16:0/20:4 | 13.66 (1.35) | 15.85 (2.14) | 14.82 (4.56) | 18.16 (5.31) | 13.00 (1.40) | 17.24 ^b (2.15) | 11.22 (2.01) | 15.65 (3.71) | 15.67 (4.23) | 12.79 (4.62) | |
| | | P-16:0/20:3 | 9.96 (2.18) | 13.67 (6.87) | 12.98 (5.61) | 11.97 (2.47) | 9.28 (1.08) | 12.98 ^b (1.86) | 9.70 (1.60) | 9.97 (2.92) | 12.78 (4.51) | 8.46 (2.90) | |
| PE (P-36:3) | 725 | P-18:1/18:2 | 3.72 (0.81) | 3.14 (1.58) | 5.84 (2.52) | 6.78 (1.40) | 4.52 (0.53) | 8.38 ^b (1.20) | 4.93 (0.81) | 4.26 (1.25) | 4.49 (1.58) | 3.90 (1.34) | |
| | | P-16:0/20:2 | 0.50 (0.08) | 0.69 ^a (0.12) | 0.58 (0.11) | 0.42 ^a (0.04) | 0.28 (0.08) | 0.53 ^a (0.21) | 0.45 (0.06) | 0.40 (0.06) | 0.59 (0.10) | 0.45 ^a (0.04) | |
| PE (P-36:2) | 727 | P-18:0/18:2 | 0.67 (0.10) | 0.83 (0.14) | 0.95 (0.18) | 0.61 ^b (0.05) | 0.45 (0.12) | 0.79 ^a (0.31) | 0.57 (0.08) | 0.45 ^a (0.07) | 0.58 (0.10) | 0.42 ^b (0.04) | |
| | | P-18:1/18:1 | 45.12 (6.97) | 45.71 (7.96) | 66.36 (12.50) | 47.92 ^a (4.24) | 53.89 (14.41) | 80.60 (31.78) | 74.56 (10.6) | 56.27 ^a (8.41) | 97.59 (16.62) | 57.84 ^b (4.92) | |
| PE (P-36:1) | 729 | P-16:0/20:1 | 5.35 (2.16) | 7.19 (1.99) | 3.48 (0.38) | 3.88 (0.54) | 3.91 (1.21) | 7.85 (6.28) | 5.94 (3.21) | 4.15 (1.00) | 8.17 (2.22) | 4.85 ^a (1.66) | |
| | | P-18:0/18:1 | 36.65 (14.78) | 41.67 (11.5) | 29.79 (3.27) | 26.52 (3.72) | 23.76 (7.36) | 45.04 (36.04) | 34.61 (18.73) | 22.45 (5.38) | 46.37 (12.58) | 26.99 ^a (9.26) | |
| PE (P-36:0) | 731 | P-18:1/18:0 | 1.72 (0.69) | 1.75 (0.49) | 1.60 (0.18) | 1.75 (0.25) | 1.49 (0.46) | 2.81 (2.25) | 2.66 (1.44) | 1.78 (0.43) | 3.75 (1.02) | 2.10 ^a (0.72) | |
| | | P-16:0/20:0 | 1.31 (0.38) | 3.23 ^b (0.82) | 2.15 (0.39) | 2.74 (0.59) | 2.01 (0.49) | 2.65 (1.54) | 3.18 (1.46) | 2.73 (0.38) | 3.59 (0.41) | 3.39 (0.38) | |
| PE (P-36:0) | 731 | P-18:0/18:0 | 13.61 (3.94) | 18.65 (4.74) | 17.54 (3.18) | 16.55 (3.57) | 13.37 (3.26) | 26.66 (15.52) | 20.24 (9.29) | 15.18 (2.12) | 21.70 (2.48) | 16.20 ^b (1.83) | |
| | | P-16:0/22:6 | 36.53 (21.38) | 36.08 (14.76) | 26.64 (4.75) | 21.62 (3.10) | 44.92 (18.30) | 50.68 (23.84) | 24.19 (2.53) | 26.47 (6.77) | 26.08 (4.65) | 21.63 (4.09) | |
| PE (P-38:6) | 747 | P-18:1/20:5 | 0.25 (0.15) | 0.22 (0.09) | 0.19 (0.03) | 0.19 (0.03) | 0.50 (0.20) | 0.40 (0.19) | 0.18 (0.02) | 0.20 (0.05) | 0.18 (0.03) | 0.13 ^b (0.02) | |
| | | P-16:0/22:5 | 26.68 (10.79) | 34.49 (17.26) | 39.88 (2.93) | 35.42 (3.95) | 22.17 (3.97) | 31.36 ^a (6.33) | 34.11 (10.56) | 34.12 (12.62) | 34.62 (17.73) | 31.14 (11.40) | |
| PE (P-38:5) | 749 | P-18:0/20:5 | 2.40 (0.97) | 2.76 (1.38) | 3.79 (0.28) | 2.68 ^b (0.30) | 1.54 (0.29) | 2.34 ^a (0.47) | 2.15 (0.66) | 1.91 (0.71) | 1.97 (1.01) | 2.01 (0.73) | |
| | | P-18:1/20:4 | 129.09 (52.20) | 152.89 (76.49) | 250.24 (18.37) | 249.85 (27.86) | 194.42 (36.50) | 251.16 (50.65) | 197.19 (61.05) | 191.76 (70.90) | 218.70 (112.02) | 187.42 (68.59) | |
| PE (P-38:4) | 751 | P-16:0/22:4 | 20.64 (4.07) | 24.57 (4.12) | 27.94 (3.26) | 27.29 (4.77) | 17.19 (1.08) | 25.56 ^b (2.35) | 22.35 (2.05) | 24.26 (5.66) | 25.34 (3.87) | 22.65 (4.72) | |
| | | P-18:0/20:4 | 70.79 (13.96) | 65.26 (10.94) | 87.35 (10.18) | 83.72 (14.65) | 63.62 (3.99) | 84.04 ^b (7.74) | 63.98 (5.86) | 56.57 (13.20) | 68.50 (10.46) | 58.71 (12.23) | |
| PE (P-38:4) | 751 | P-18:1/20:3 | 4.52 (0.89) | 5.59 (0.94) | 6.66 (0.78) | 7.65 (1.34) | 7.90 (0.50) | 8.41 (0.78) | 7.52 (0.69) | 7.16 (1.67) | 9.69 (1.48) | 8.51 (1.77) | |
| | | P-16:0/22:3 | 5.85 (1.04) | 6.13 (0.96) | 9.17 (0.53) | 10.07 (1.21) | 5.63 (0.66) | 8.34 ^b (1.56) | 6.72 (0.66) | 7.56 (1.32) | 9.15 (0.38) | 7.58 ^b (0.88) | |
| PE (P-38:3) | 753 | P-18:0/20:3 | 42.61 (7.56) | 47.74 (7.45) | 50.25 (2.89) | 50.64 (6.08) | 33.52 (3.91) | 44.99 ^a (8.42) | 33.24 (3.26) | 31.73 (5.54) | 37.96 (1.58) | 32.00 ^a (3.73) | |
| | | P-18:1/20:2 | 25.76 (2.76) | 29.90 (2.76) | 33.78 (2.89) | 38.20 (6.08) | 27.57 (3.91) | 39.7 ^a (8.42) | 31.82 (3.26) | 32.67 (5.54) | 35.89 (1.58) | 28.00 ^b (3.73) | |

| | | | | | | | | | | | | | |
|--------------|-------------|-------------|----------|--------------------|---------|--------------------|----------|----------------------|---------|--------------------|---------|---------------------|--|
| | | | (4.57) | (4.66) | (1.94) | (4.58) | (3.22) | (7.43) | (3.12) | (5.70) | (1.50) | (3.27) | |
| PE (P-38:2) | 755 | P-18:0/20:2 | 1.16 | 1.87 ^a | 1.87 | 1.20 ^b | 1.27 | 1.39 | 1.30 | 1.05 | 5.08 | 2.72 ^a | |
| | | | (0.42) | (0.27) | (0.24) | (0.18) | (0.91) | (0.53) | (0.19) | (0.28) | (1.62) | (0.57) | |
| PE (P-40:7) | 773 | P-18:1/20:1 | 15.45 | 22.54 ^a | 28.94 | 22.54 ^a | 33.81 | 37.20 | 33.61 | 24.38 ^a | 42.37 | 26.19 ^a | |
| | | | (5.55) | (3.26) | (3.76) | (3.47) | (24.23) | (14.18) | (4.91) | (6.56) | (13.51) | (5.52) | |
| PE (P-40:6) | 775 | P-18:1/22:6 | 24.02 | 22.77 | 24.46 | 25.08 | 29.52 | 32.20 | 29.33 | 27.93 | 32.78 | 28.70 | |
| | | | (3.34) | (3.94) | (1.66) | (2.59) | (6.75) | (9.30) | (2.10) | (2.05) | (4.47) | (3.51) | |
| PE (P-40:5) | 777 | P-16:0/24:6 | 0.41 | 0.56 | 0.21 | 0.18 | 0.27 | 0.42 ^b | 0.31 | 0.32 | 0.36 | 0.42 | |
| | | | (0.18) | (0.15) | (0.05) | (0.04) | (0.05) | (0.08) | (0.07) | (0.05) | (0.08) | (0.06) | |
| PE (P-40:4) | 779 | P-18:0/22:6 | 167.74 | 175.76 | 106.54 | 93.39 | 171.97 | 215.74 ^a | 156.80 | 161.02 | 182.01 | 168.55 | |
| | | | (74.67) | (47.50) | (24.34) | (22.26) | (33.18) | (38.29) | (37.08) | (25.74) | (42.40) | (25.80) | |
| PE (P-40:3) | 781 | P-18:1/22:5 | 3.12 | 3.87 | 2.38 | 2.22 | 5.55 | 6.36 | 4.21 | 4.49 | 5.51 | 4.99 | |
| | | | (1.39) | (1.05) | (0.54) | (0.53) | (1.07) | (1.13) | (1.00) | (0.72) | (1.28) | (0.76) | |
| PE (O-34:0) | | P-16:0/24:5 | 1.87 | 2.70 ^a | 2.64 | 2.12 ^a | 0.97 | 1.73 ^b | 1.43 | 1.56 | 1.17 | 1.55 | |
| | | | (0.11) | (0.61) | (0.26) | (0.21) | (0.09) | (0.09) | (0.11) | (0.22) | (0.30) | (0.25) | |
| PE (O-34:0) | | P-18:0/22:5 | 58.18 | 53.79 | 71.75 | 61.18 ^a | 39.67 | 52.05 ^b | 45.80 | 38.88 ^a | 46.44 | 39.67 | |
| | | | (3.44) | (12.17) | (7.06) | (6.03) | (3.50) | (2.69) | (3.36) | (5.52) | (11.89) | (6.51) | |
| PE (O-34:0) | | P-18:1/22:4 | 80.99 | 93.15 | 108.94 | 116.85 | 103.57 | 128.27 ^b | 115.52 | 102.61 | 128.76 | 106.08 | |
| | | | (4.79) | (21.07) | (10.73) | (11.51) | (9.14) | (6.63) | (8.48) | (14.57) | (32.96) | (17.41) | |
| PE (O-34:0) | | P-20:1/20:4 | 2.91 | 2.74 | 3.95 | 4.07 | 3.14 | 3.72 ^a | 3.68 | 2.58 ^b | 3.62 | 3.30 | |
| | | | (0.17) | (0.62) | (0.39) | (0.40) | (0.28) | (0.19) | (0.27) | (0.37) | (0.93) | (0.54) | |
| PE (O-34:0) | | P-16:0/24:4 | 0.73 | 0.92 ^a | 0.68 | 0.79 | 0.44 | 0.59 | 0.67 | 0.60 | 0.78 | 0.47 ^b | |
| | | | (0.07) | (0.13) | (0.11) | (0.11) | (0.14) | (0.14) | (0.05) | (0.10) | (0.11) | (0.05) | |
| PE (O-34:0) | | P-18:0/22:4 | 37.56 | 39.10 | 37.12 | 48.57 ^a | 30.90 | 37.68 | 32.92 | 31.23 | 36.27 | 27.60 ^a | |
| | | | (3.82) | (5.69) | (5.85) | (6.93) | (7.79) | (8.61) | (2.25) | (5.10) | (5.17) | (2.74) | |
| PE (O-34:0) | | P-18:1/22:3 | 1.84 | 2.29 ^a | 2.98 | 4.91 ^b | 5.10 | 5.32 | 4.80 | 4.64 | 6.46 | 5.14 ^a | |
| | | | (0.19) | (0.33) | (0.47) | (0.70) | (1.29) | (1.22) | (0.33) | (0.76) | (0.92) | (0.51) | |
| PE (O-34:0) | | P-20:0/20:4 | 1.44 | 1.53 | 1.37 | 1.57 | 1.13 | 1.19 | 1.24 | 0.98 ^a | 1.47 | 1.08 ^b | |
| | | | (0.15) | (0.22) | (0.22) | (0.22) | (0.28) | (0.27) | (0.08) | (0.16) | (0.21) | (0.11) | |
| PE (O-34:0) | | P-18:0/22:3 | 10.09 | 11.84 | 15.72 | 17.17 | 4.84 | 4.00 | 12.10 | 10.62 | 10.66 | 12.99 | |
| | | | (1.68) | (2.83) | (0.92) | (2.85) | (0.90) | (0.42) | (1.91) | (3.77) | (2.52) | (4.35) | |
| PE (O-34:0) | | P-18:1/22:2 | 15.32 | 17.63 | 23.68 | 26.85 | 24.24 | 29.72 ^a | 16.98 | 18.17 | 15.06 | 17.52 | |
| | | | (2.55) | (4.21) | (1.38) | (4.46) | (4.49) | (3.11) | (2.69) | (6.45) | (3.56) | (5.86) | |
| Total Pls-PE | | | 843.31 | 934.06 | 1025.75 | 1006.84 | 898.83 | 1203.48 ^a | 959.55 | 877.55 | 1138.23 | 843.20 ^b | |
| PE (O-34:0) | | | (102.31) | (79.67) | (67.31) | (79.11) | (125.78) | (237.76) | (85.63) | (165.18) | (83.90) | (47.61) | |
| PE (O-34:0) | P-18:0/16:0 | | 0.92 | 1.52 ^a | 1.27 | 2.35 | 0.77 | 1.93 ^a | 1.54 | 1.70 | 2.33 | 2.66 | |
| PE (O-34:0) | | | (0.23) | (0.38) | (0.42) | (1.18) | (0.44) | (0.67) | (0.53) | (0.92) | (1.42) | (0.92) | |

Note: Data presented here as Mean ± SD of 4 mice in a group. Statistical analysis was done with a paired *t*-test, where *p* < 0.05 was considered as significant. Statistical significance is denoted as follows: ^a*p* < 0.05, ^b*p* < 0.01. WT vs. J20.

Table S2. Pls-PC and alkyl-acyl-PC molecular species concentration (pmol/mg tissue (±SD)) in the hippocampus of wild-type and J20 mice.

| Lipid Name | m/z | Molecular species | 3M | | 6M | | 9M | | 12M | | 15M | |
|-------------|-----|-------------------|-------------|-------------------|-------------|-------------------|-------------|-------------------|-------------|--------------|-------------|-------------------|
| | | | WT (±SD) | J20 (±SD) | WT (±SD) | J20 (±SD) | WT (±SD) | J20 (±SD) | WT (±SD) | J20 (±SD) | WT (±SD) | J20 (±SD) |
| PC (P-32:1) | 715 | P-16:0/16:1 | 0.71 | 0.97 | 0.78 | 0.74 | 0.72 | 0.92 | 0.78 | 0.95 | 0.96 | 1.09 |
| PC (P-32:0) | 717 | P-16:0/16:0 | 8.29 | 8.76 | 9.28 | 10.65 | 9.43 | 8.33 ^b | 8.45 | 8.94 | 9.97 | 9.87 |
| PC (P-34:1) | 743 | P-16:0/18:1 | 13.36 | 14.07 | 14.52 | 13.94 | 12.72 | 14.07 | 14.41 | 14.27 | 14.55 | 17.31 |
| PC (P-34:0) | 745 | P-18:0/16:0 | 88.92 | 98.07 | 101.97 | 106.75 | 91.90 | 97.78 | 95.28 | 102.01 | 99.21 | 103.92 |
| PC (P-36:5) | 763 | P-16:0/20:5 | 33.06 | 30.77 | 36.49 | 36.25 | 34.81 | 31.65 | 30.49 | 32.31 | 37.51 | 37.00 |
| PC (P-36:4) | 765 | P-16:0/20:4 | 1.11 | 2.08 ^b | 1.44 | 1.18 ^b | 1.70 | 1.67 | 1.58 | 1.32 | 1.73 | 1.69 |
| PC (P-36:3) | 767 | P-16:0/20:3 | 7.18 | 8.01 | 7.27 | 6.89 | 7.49 | 8.13 | 6.37 | 7.30 | 7.52 | 9.33 ^a |

| | | | | | | | | | | | | |
|---------------------|-----|-------------|-------------------|-----------------------------|-------------------|-----------------------------|-------------------|-------------------|-------------------|-----------------------------|-------------------|--------------------------------|
| PC (P-36:2) | 769 | P-18:0/18:2 | 3.64 (0.85) | 3.21 (0.60) | 6.20 (0.75) | 5.02 ^a (0.73) | 5.91 (2.07) | 6.68 (2.94) | 7.21 (0.93) | 6.37 (0.96) | 7.10 (1.31) | 7.79 (2.47) |
| PC (P-36:1) | 771 | P-18:0/18:1 | 5.17 (1.10) | 5.42 (1.06) | 7.43 (1.20) | 5.87 ^a (0.95) | 5.92 (1.76) | 5.68 (1.39) | 6.33 (0.57) | 5.59 (0.95) | 6.92 (1.30) | 6.40 (1.71) |
| PC (P-36:0) | 773 | P-20:0/16:0 | 3.46 (0.60) | 4.11 (1.55) | 3.35 (0.64) | 3.43 (0.91) | 3.67 (1.87) | 2.94 (0.59) | 2.80 (0.41) | 3.13 (1.05) | 3.90 (1.66) | 3.92 (1.01) |
| PC (P-38:6) | 789 | P-16:0/22:6 | 2.40 (0.19) | 3.15 ^b (0.08) | 3.88 (0.22) | 4.70 (0.94) | 4.34 (0.76) | 3.38 (0.32) | 4.17 (0.84) | 3.98 (0.40) | 3.96 (0.38) | 4.53 (0.52) |
| PC (P-38:5) | 791 | P-16:0/22:5 | 12.63 (1.88) | 14.42 (0.99) | 15.67 (1.58) | 15.32 (3.52) | 15.69 (2.79) | 16.91 (2.41) | 16.13 (1.46) | 16.47 (2.06) | 17.95 (2.27) | 20.68 (2.86) |
| PC (P-38:4) | 793 | P-18:0/20:4 | 0.67 (0.31) | 0.58 (0.16) | 1.79 (0.27) | 1.42 ^a (0.14) | 0.61 (0.38) | 0.43 (0.10) | 0.31 (0.24) | 0.51 (0.12) | 0.53 (0.11) | 0.52 (0.17) |
| PC (P-38:3) | 795 | P-18:0/20:3 | 0.53 (0.13) | 0.86 ^a (0.08) | 1.64 (0.35) | 1.68 (0.26) | 0.85 (0.30) | 0.95 (0.27) | 1.03 (0.44) | 1.15 (0.37) | 1.26 (0.20) | 1.51 (0.41) |
| PC (P-38:2) | 797 | P-18:0/20:2 | 0.40 (0.03) | 0.43 (0.25) | 1.36 (0.35) | 0.88 ^a (0.32) | 1.01 (0.43) | 1.19 (0.32) | 1.48 (0.12) | 1.03 ^b (0.25) | 1.79 (0.56) | 1.69 (0.87) |
| PC (P-40:6) | 817 | P-18:0/22:6 | 0.46 (0.09) | 0.39 (0.06) | 0.56 (0.03) | 0.62 (0.20) | 0.72 (0.07) | 0.78 (0.34) | 0.71 (0.21) | 0.63 (0.13) | 0.65 (0.10) | 0.82 (0.12) |
| Total Pls-PC | | | 174.51 (12.51) | 186.47 (5.30) | 201.63 (12.41) | 204.66 (22.23) | 187.14 (22.76) | 191.63 (20.70) | 186.75 (11.77) | 195.88 (18.82) | 203.60 (24.08) | 215.64 (17.39) |
| PC (O-32:0) | 719 | O-16:0/16:0 | 75.06 (9.41) | 72.90 (11.86) | 76.87 (6.80) | 80.69 (9.02) | 80.35 (8.07) | 74.82 (8.97) | 72.66 (10.39) | 73.06 (3.25) | 75.38 (8.02) | 88.20 ^a (9.54) |
| PC (O-34:1) | 745 | O-16:0/18:1 | 27.31 (7.01) | 28.60 (5.03) | 28.11 (3.96) | 25.29 (0.92) | 27.14 (6.94) | 29.18 (9.39) | 28.90 (7.98) | 28.15 (1.97) | 26.10 (2.72) | 32.89 ^a (3.54) |
| PC (O-34:0) | 747 | O-18:0/16:0 | 4.81 (1.01) | 4.96 (0.91) | 5.89 (1.02) | 5.89 (0.94) | 5.79 (1.45) | 5.27 (1.71) | 4.87 (1.37) | 4.42 (0.33) | 4.87 (0.46) | 5.76 (0.91) |
| PC (O-36:1) | 773 | O-18:0/18:1 | 14.31 (4.71) | 13.61 (1.95) | 14.90 (3.81) | 12.70 (2.28) | 13.93 (3.63) | 14.03 (4.19) | 15.08 (4.80) | 12.79 (1.02) | 12.37 (0.62) | 15.38 ^a (2.73) |
| PC (O-36:0) | 775 | O-20:0/16:0 | 1.55 (0.31) | 1.44 (0.13) | 1.93 (0.38) | 1.93 (0.13) | 1.80 (0.42) | 2.06 (0.77) | 1.96 (0.39) | 1.58 (0.17) | 1.69 (0.17) | 2.43 ^a (0.60) |
| Total alkyl-acyl-PC | | | 120.39 (21.70) | 118.90 (18.43) | 124.45 (14.41) | 123.25 (12.19) | 125.88 (19.47) | 122.23 (23.79) | 120.54 (23.92) | 117.48 (5.31) | 117.67 (9.77) | 137.98 ^a (11.32) |

Note: Data presented here as Mean ± SD of 4 mice in a group. Statistical analysis was done with a paired *t*-test, where *p* < 0.05 was considered as significant. Statistical significance is denoted as follows: ^a<0.05, ^b*p* < 0.01. WT vs. J20.

Table S3. Principal component loading (highest five species) of Pls-PE species at five different time points.

| Timepoint | Pls-PE species | Loading | Raw <i>p</i> Value | Pls-PE species | Loading | Raw <i>p</i> Value |
|-----------|------------------|------------------|--------------------|------------------|--------------|--------------------|
| 3 month | PE (P-18p1/22:2) | PC1 (42.20%) | | PE (P-16:0/24:6) | PC2 (26.20%) | |
| | | -0.22286 | 0.19 | | -0.28536 | 0.1 |
| | | -0.22113 | 0.16 | | -0.28178 | 0.15 |
| | | -0.21096 | 0.33 | | -0.25883 | 0.4 |
| | | -0.21057 | 0.25 | | -0.25218 | 0.08 |
| | PE (P-18:0/22:4) | -0.20766 | 0.15 | | -0.24641 | 0.06 |
| | | PC1 (36.00%) | | PE (P-16:0/22:6) | PC2 (31.60%) | |
| | | -0.22806 | 0.35 | | 0.22327 | 0.11 |
| | | -0.22538 | 0.42 | | 0.23779 | 0.06 |
| | | -0.21845 | 0.11 | | 0.24735 | 0.02 |
| 6 month | PE (P-16:0/20:3) | -0.21722 | 0.38 | PE (P-18:0/22:4) | 0.25948 | 0.002 |
| | | 0.23442 | 0.03 | | -0.22207 | 0.07 |
| | | PC1 (54.00%) | | | PC2 (23.00%) | |
| | | -0.20595 | 0.03 | | -0.30747 | 0.05 |
| | | PE (P-16:0/20:2) | | | | |

| | | | | | | |
|----------|------------------|----------|-------|------------------|----------|-------|
| | PE (P-16:0/22:3) | -0.20523 | 0.009 | PE (P-16:0/22:5) | -0.30365 | 0.02 |
| | PE (P-18:1/20:2) | -0.20515 | 0.01 | PE (P-18:0/20:5) | -0.30223 | 0.01 |
| | PE (P-18:0/18:2) | -0.20402 | 0.04 | PE (P-16:0/20:4) | -0.23033 | 0.008 |
| | PE (P-18:0/20:3) | -0.20361 | 0.02 | PE (P-16:0/20:3) | -0.22394 | 0.007 |
| | PC1 (37.90%) | | | PC2 (29.40%) | | |
| 12 month | PE (P-18:1/22:4) | 0.22012 | 0.09 | PE (P-18:0/18:1) | -0.25242 | 0.13 |
| | PE (P-18:1/18:2) | 0.22772 | 0.2 | PE (P-18:1/18:0) | -0.25122 | 0.14 |
| | PE (P-18:0/20:4) | 0.22813 | 0.17 | PE (P-18:0/18:0) | -0.24975 | 0.17 |
| | PE (P-18:1/20:3) | 0.22949 | 0.35 | PE (P-16:0/20:1) | -0.24931 | 0.16 |
| | PE (P-18:0/22:3) | 0.23292 | 0.27 | PE (P-16:0/20:0) | -0.23915 | 0.29 |
| | PC1 (47%) | | | PC2 (33.4%) | | |
| 15 month | PE (P-16:0/24:4) | 0.21278 | 0.001 | PE (P-18:1/18:1) | 0.25835 | 0.001 |
| | PE (P-20:0/20:4) | 0.21266 | 0.008 | PE (P-18:0/22:3) | -0.25558 | 0.19 |
| | PE (P-18:0/22:4) | 0.21132 | 0.01 | PE (P-16:0/20:0) | -0.25123 | 0.26 |
| | PE (P-18:1/20:2) | 0.21116 | 0.002 | PE (P-18:1/18:0) | -0.24674 | 0.01 |
| | PE (P-16:0/22:3) | 0.20837 | 0.002 | PE (P-18:0/20:5) | -0.24559 | 0.47 |

Note: Criteria: Autoscaling was used for data normalization. Loading value was selected irrespective of positive and negative signs.

Table S4. Principal component loading (highest five species) of Pls-PC species at five different time points.

| Timepoint | Pls-PC Species | Loading | Raw p Value | Pls-PC species | Loading | Raw p Value |
|-----------|------------------|----------|-------------|------------------|----------|-------------|
| 3 month | PC1 (40.60%) | | | PC2 (26.70%) | | |
| | PC (P-16:0/22:6) | -0.33672 | 0.0001 | PC (P-18:0/18:2) | -0.38945 | 0.22 |
| | PC (P-16:0/16:1) | -0.33026 | 0.01 | PC (P-18:0/18:1) | -0.38291 | 0.38 |
| | PC (P-16:0/22:5) | -0.3151 | 0.07 | PC (P-16:0/18:1) | -0.28331 | 0.27 |
| | PC (P-18:0/16:0) | -0.30612 | 0.03 | PC (P-18:0/22:6) | 0.27982 | 0.0001 |
| 6 month | PC1 (32.20%) | | | PC2 (29.70%) | | |
| | PC (P-16:0/22:6) | -0.33672 | 0.07 | PC (P-16:0/16:0) | 0.35644 | 0.08 |
| | PC (P-16:0/16:1) | -0.33026 | 0.29 | PC (P-16:0/22:6) | 0.40728 | 0.07 |
| | PC (P-16:0/22:5) | -0.3151 | 0.47 | PC (P-18:0/18:2) | -0.37247 | 0.03 |
| | PC (P-18:0/16:0) | -0.30612 | 0.22 | PC (P-18:0/20:2) | -0.36006 | 0.04 |
| 9 month | PC (P-16:0/20:4) | -0.30477 | 0.007 | PC (P-16:0/20:4) | -0.31506 | 0.007 |
| | PC1 (53.60%) | | | PC2 (18.10%) | | |
| | PC (P-18:0/20:2) | -0.33161 | 0.27 | PC (P-16:0/20:4) | -0.49645 | 0.47 |
| | PC (P-16:0/22:5) | -0.33148 | 0.27 | PC (P-20:0/16:0) | -0.28366 | 0.24 |
| | PC (P-18:0/18:2) | -0.32327 | 0.34 | PC (P-16:0/20:5) | 0.34045 | 0.12 |
| 12 month | PC (P-18:0/20:3) | -0.31354 | 0.32 | PC (P-18:0/20:4) | 0.36718 | 0.19 |
| | PC (P-18:0/18:1) | -0.30923 | 0.42 | PC (P-16:0/20:3) | 0.46927 | 0.18 |
| | PC1 (32.40%) | | | PC2 (25.10%) | | |
| | PC (P-18:0/16:0) | 0.33347 | 0.43 | PC (P-16:0/20:5) | -0.41387 | 0.22 |
| | PC (P-16:0/22:5) | 0.36207 | 0.35 | PC (P-18:0/20:3) | -0.29676 | 0.07 |
| 15 month | PC (P-18:0/18:1) | 0.38914 | 0.12 | PC (P-16:0/20:3) | 0.4027 | 0.16 |
| | PC (P-16:0/18:1) | 0.39128 | 0.44 | PC (P-16:0/20:4) | 0.41338 | 0.11 |
| | PC (P-18:0/18:2) | 0.39792 | 0.13 | PC (P-18:0/22:6) | 0.44681 | 0.27 |
| | PC1 (53.60%) | | | PC2 (16.20%) | | |
| | PC (P-18:0/20:2) | 0.30127 | 0.42 | PC (P-16:0/20:5) | -0.52488 | 0.43 |
| | PC (P-16:0/22:5) | 0.30894 | 0.09 | PC (P-16:0/16:0) | -0.39196 | 0.12 |
| | PC (P-18:0/22:6) | 0.31313 | 0.03 | PC (P-18:0/16:0) | -0.37846 | 0.31 |
| | PC (P-18:0/18:2) | 0.31362 | 0.32 | PC (P-16:0/20:3) | -0.35975 | 0.009 |
| | PC (P-16:0/16:1) | 0.3292 | 0.46 | PC (P-18:0/20:4) | -0.24709 | 0.44 |

Note: Criteria: Autoscaling was used for data normalization. Loading value was selected irrespective of positive and negative signs.

Table S5. Principal component loading (highest five species) of alkyl-acyl-PC species at five different time points.

| Time point | Alkyl-acyl-PC species | Loading | Raw <i>p</i> Value | Alkyl-acyl-PC species | Loading | Raw <i>p</i> Value |
|------------|-----------------------|----------|--------------------|-----------------------|----------|--------------------|
| 3 month | PC1 (85.30%) | | | PC2 (6.90%) | | |
| | PC (O-16:0/18:1) | -0.47732 | 0.39 | PC (O-20:0/16:0) | -0.82828 | 0.28 |
| | PC (O-18:0/16:0) | -0.47345 | 0.41 | PC (O-18:0/16:0) | 0.036094 | 0.41 |
| | PC (O-16:0/16:0) | -0.43783 | 0.39 | PC (O-16:0/18:1) | 0.097863 | 0.39 |
| | PC (O-18:0/18:1) | -0.42904 | 0.39 | PC (O-16:0/16:0) | 0.11104 | 0.39 |
| | PC (O-20:0/16:0) | -0.41503 | 0.28 | PC (O-18:0/18:1) | 0.53921 | 0.39 |
| | PC1 (70.2%) | | | PC2 (16.5%) | | |
| | PC (O-18:0/16:0) | -0.49662 | 0.49 | PC (O-16:0/16:0) | -0.69298 | 0.26 |
| | PC (O-18:0/18:1) | -0.47624 | 0.18 | PC (O-18:0/16:0) | 0.43175 | 0.49 |
| | PC (O-16:0/18:1) | -0.44389 | 0.11 | PC (O-20:0/16:0) | -0.36762 | 0.49 |
| 6 month | PC (O-20:0/16:0) | -0.40847 | 0.49 | PC (O-18:0/18:1) | 0.3998 | 0.18 |
| | PC (O-16:0/16:0) | -0.40333 | 0.26 | PC (O-16:0/18:1) | 0.1959 | 0.11 |
| | PC1 (89.80%) | | | PC2 (7.20%) | | |
| | PC (O-16:0/16:0) | 0.43429 | 0.19 | PC (O-20:0/16:0) | -0.72829 | 0.29 |
| | PC (O-16:0/18:1) | 0.46491 | 0.43 | PC (O-16:0/18:1) | -0.23638 | 0.43 |
| | PC (O-18:0/16:0) | 0.44893 | 0.27 | PC (O-18:0/18:1) | 0.082755 | 0.48 |
| | PC (O-18:0/18:1) | 0.46525 | 0.48 | PC (O-18:0/16:0) | 0.29489 | 0.27 |
| | PC (O-20:0/16:0) | 0.42102 | 0.29 | PC (O-16:0/16:0) | 0.56561 | 0.19 |
| | PC1 (89.3%) | | | PC2 (6.9%) | | |
| | PC (O-16:0/16:0) | 0.43967 | 0.47 | PC (O-16:0/16:0) | -0.60988 | 0.47 |
| 9 month | PC (O-16:0/18:1) | 0.45503 | 0.43 | PC (O-16:0/18:1) | -0.42995 | 0.43 |
| | PC (O-18:0/16:0) | 0.45619 | 0.27 | PC (O-18:0/16:0) | 0.14211 | 0.27 |
| | PC (O-18:0/18:1) | 0.45192 | 0.19 | PC (O-18:0/18:1) | 0.37177 | 0.19 |
| | PC (O-20:0/16:0) | 0.43277 | 0.06 | PC (O-20:0/16:0) | 0.53365 | 0.06 |
| | PC1 (70.70%) | | | PC2 (22.10%) | | |
| | PC (O-16:0/16:0) | -0.38223 | 0.04 | PC (O-16:0/16:0) | -0.6282 | 0.04 |
| | PC (O-16:0/18:1) | -0.46447 | 0.03 | PC (O-18:0/16:0) | -0.52056 | 0.07 |
| | PC (O-18:0/16:0) | -0.43092 | 0.07 | PC (O-16:0/18:1) | 0.23601 | 0.03 |
| | PC (O-18:0/18:1) | -0.47744 | 0.04 | PC (O-20:0/16:0) | 0.3565 | 0.03 |
| | PC (O-20:0/16:0) | -0.47384 | 0.03 | PC (O-18:0/18:1) | 0.38935 | 0.04 |

Note: Criteria: Autoscaling was used for data normalization. Loading value was selected irrespective of positive and negative signs.