Electronic Supplementary Material (ESI) for Food & Function.


# CDAHFD-induces a NASH model mimicking the clinic in the metabolism of hepatic phosphatidylcholines and acyl carnitines

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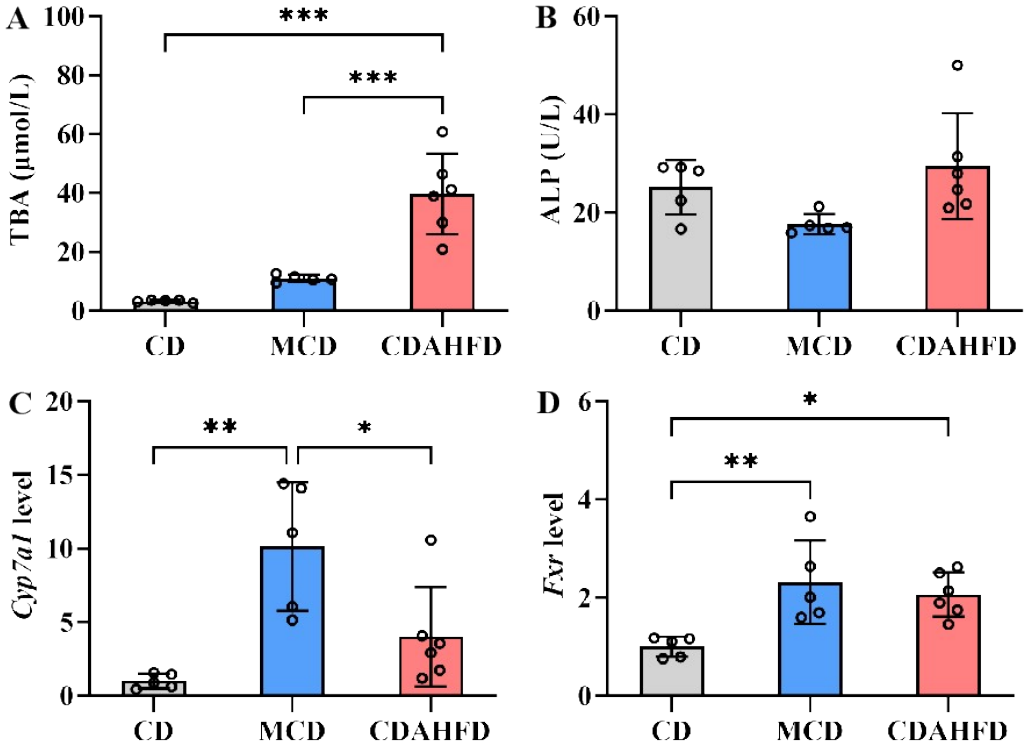


**Fig. S1** The overload of bile acid and their synthesis adaptation were more pronounced in CDAHFD-induced NASH. (A) Serum TBA level in mice. (B) Serum ALP level in mice. (C, D) The relative mRNA levels of *Cyp7a1* and *Fxr* were determined by qPCR and normalized with 18S. Data was expressed as mean ± SD. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, respectively.

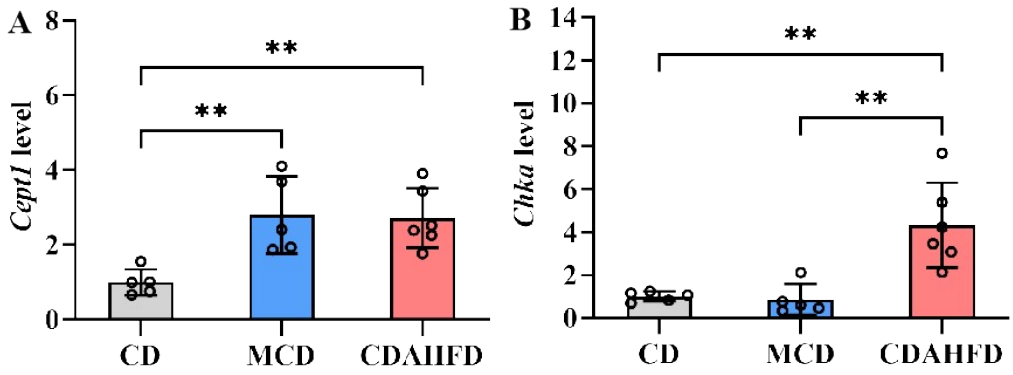


**Fig. S2** Effects of the MCD and CDAHFD diets on the transcription of genes involved PC synthesis. (A, B) The relative mRNA levels of *Cept1* and *Chka* were determined by qPCR and normalized with 18S. Data was expressed as mean ± SD. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, respectively.

**Table S1.** The ingredients and nutrient compositions of the diets used in this study.

| Ingredient (gm) | CD | MCD | CDAHFD |
|---|---|---|---|
| L-Alanine | 0 | 3.5 | 6.0 |
| L-Arginine | 19.8 | 12.0 | 7.1 |
| L-Asparagine | 0 | 5.9 | 0 |
| L-Aspartic Acid | 10 | 3.5 | 14.3 |
| L-Cystine | 6.6 | 3.5 | 5.0 |
| L-Glutamine | 0 | 39.6 | 45.0 |
| Glycine | 10 | 23.1 | 3.5 |
| L-Histidine | 8 | 4.5 | 5.4 |
| L-Isoleucine | 14 | 8.1 | 9.0 |
| L-Leucine | 28.8 | 11.0 | 18.6 |
| L-Lysine | 16.4 | 17.8 | 15.6 |
| L-Phenylalanine | 10 | 7.4 | 9.9 |
| L-Proline | 0 | 3.5 | 21.0 |
| L-Serine | 10 | 3.5 | 11.8 |
| L-Threonine | 13 | 8.1 | 8.5 |
| L-Tryptophan | 3.8 | 1.8 | 2.5 |
| L-Tyrosine | 12 | 5.0 | 10.8 |
| L-Valine | 16.8 | 8.1 | 11.0 |
| Sucrose | 140 | 451.1 | 203.7 |

| | | | |
|---|---|---|---|
| Corn Starch | 0 | 148.6 | 90.9 |
| Maltodextrin 10 | 30.3 | 49.5 | 117.9 |
| Cellulose | 150 | 29.7 | 58.9 |
| Corn Oil | 20 | 99.1 | 0 |
| Soybean Oil | 0 | 0 | 29.5 |
| Mineral Mix | 24 | 34.7 | 11.8 |
| Sodium Bicarbonate | 0 | 7.4 | 8.8 |
| Vitamin Mix | 24 | 9.9 | 11.8 |
| L-Methionine | 4 | 0 | 0.9 |
| Choline | 2.5 | 0 | 0 |
| Cholesterol | 20 | 0 | 10.3 |
| FD&C Yellow Dye #5 | 0 | 0 | 0.1 |
| Potassium Citrate | 10 | 0 | 19.5 |
| Calcium Carbonate | 16 | 0 | 6.5 |
| DiCalcium Phosphate | 10 | 0 | 15.3 |
| Lard | 80 | 0 | 209.2 |
| crude ash | 290 | 0 | 0 |
| Total (gm) | 1000 | 1000 | 1000 |
| Kcal percentage (%) | | | |
| Protein | 18 | 16 | 18 |
| Carbohydrate | 78 | 63 | 36 |

| | | | |
|---|---|---|---|
| Fat | 4 | 21 | 46 |
| Total (%) | 100 | 100 | 100 |

**Table S2.** The primer sequences used in the qPCR analysis in this study.

| Genes | Forward primer | Reverse primer |
|---|---|---|
| *Srebf1* | TGACCCGGCTATTCCGTGA | CTGGGCTGAGCAATACAGTTC |
| *Plin2* | CTTGTGTCCTCCGCTTATGTC | GCAGAGGTCACGGTCTTCAC |
| *Abca1* | GCTTGTTGGCCTCAGTTAAGG | GTAGCTCAGGCGTACAGAGAT |
| *Il-2* | TGAGCAGGATGGAGAATTACAGG | GTCCAAGTTCATCTTCTAGGCAC |
| *Tnf-α* | CCCTCACACTCAGATCATCTTCT | GCTACGACGTGGGCTACAG |
| *Il-10* | CTTACTGACTGGCATGAGGATCA | GCAGCTCTAGGAGCATGTGG |
| *Ccl2* | TTAAAAACCTGGATCGGAACCAA | GCATTAGCTTCAGATTTACGGGT |
| *Cyclin D1* | GCGTACCCTGACACCAATCTC | CTCCTCTTCGCACTTCTGCTC |
| *Cyclin E1* | CTCCGACCTTTCAGTCCGC | CACAGTCTTGTCAATCTTGGCA |
| *Cyclin B1* | GCGTGTGCCTGTGACAGTTA | CCTAGCGTTTTTGCTTCCCTT |
| *Ki67* | ATCATTGACCGCTCCTTTAGGT | GCTCGCCTTGATGGTTCCT |
| *Pcyt1a* | GATGCACAGAGTTCAGCTAAAGT | TGGCTGCCGTAAACCAACTG |
| *Pemt* | ATCACCATTGTGTTCAACCCAC | CCAGGGAATAGCAGGCTAGG |
| *Lpcat* | GGCTCCTGTTCGCTGCTTT | TTCCTCCATAAGGCCAGGGG |
| *Cept1* | ATGAGTGGGCATCGGTCAAC | GTGGTGTCGGTAACTGAAACAA |
| *Chka* | CAGGGGTGGTCTCAGTAACAT | CGCAAGAGCACTTTCCGAG |
| *Cpt1* | TGGCATCATCACTGGTGTGTT | GTCTAGGGTCCGATTGATCTTTG |
| *Cpt2* | CAGCACAGCATCGTACCCA | TCCCAATGCCGTTCTCAAAAT |
| *Acox1* | CCGCCACCTTCAATCCAGAG | CAAGTTCTCGATTTCTCGACGG |
| *Cyp7a1* | GTCCGGATATTCAAGGATGC | GGGAATGCCATTTACTTGGA |

| | | |
|---|---|---|
| *Fxr* | GCTTGATGTGCTACAAAAGCTG | CGTGGTGATGGTTGAATGTCC |

**Table S3.** Changed liver lipid metabolites in the MCD group versus the CDAHFD group.

| NO | Molecular Formula | Compound | Rt(min) | [M+H]+ m/z |
|---|---|---|---|---|
| 1 | C21H35NO8 | AC(14:3;O4) | 0.877 | 430.24179 |
| 2 | C33H53NO4 | AC(26:6) | 1.387 | 528.40918 |
| 3 | C39H69NO5 | AC(32:4;O) | 11.872 | 632.52179 |
| 4 | C30H57NO4 | Cer(30:2;O3) | 2.64 | 496.42206 |
| 5 | C36H71NO5 | Cer(36:1;O4) | 2.379 | 598.49377 |
| 6 | C36H62O5 | DG(33:4) | 13.821 | 575.50781 |
| 7 | C38H64O5 | DG(35:5) | 16.275 | 601.51599 |
| 8 | C50H97NO13 | Hex2Cer(38:0;O2) | 16.271 | 920.69122 |
| 9 | C41H75NO8 | HexCer(35:3;O2) | 2.979 | 710.60345 |
| 10 | C45H81NO10 | HexCer(39:4;O4) | 11.464 | 796.56824 |
| 11 | C47H83NO9 | HexCer(41:5;O3) | 8.975 | 806.61908 |
| 12 | C50H97NO10 | HexCer(44:1;O4) | 16.527 | 872.76288 |
| 13 | C39H68NO14P | IPC(33:5;O5) | 9.033 | 806.44476 |
| 14 | C40H80NO13P | IPC(34:0;O4) | 13.822 | 814.54156 |
| 15 | C42H84NO11P | IPC(36:0;O2) | 12.05 | 810.58716 |
| 16 | C40H80NO8P | PC(32:0) | 12.656 | 734.57214 |
| 17 | C42H80NO8P | PC(34:2) | 10.527 | 758.54956 |
| 18 | C42H78NO8P | PC(34:3) | 8.719 | 756.55597 |
| 19 | C44H86NO8P | PC(36:1) | 13.75 | 788.60742 |
| 20 | C46H80NO8P | PC(38:6) | 8.608 | 806.56097 |

| | | | | |
|---|---|---|---|---|
| 21 | C48H84NO8P | PC(40:6) | 12.06 | 834.60004 |
| 22 | C48H82NO8P | PC(40:7) | 9.228 | 832.57965 |
| 23 | C43H84NO7P | PC(O-35:2) | 10.315 | 758.58905 |
| 24 | C41H80NO8P | PE(36:1) | 13.933 | 746.56024 |
| 25 | C46H80NO8P | PE(41:6) | 8.877 | 806.57257 |
| 26 | C43H84NO7P | PE(O-38:2) | 10.378 | 758.60028 |
| 27 | C47H84NO7P | PE(O-42:6) | 8.182 | 806.57257 |
| 28 | C43H84NO10P | PS(37:0) | 9.094 | 806.57257 |
| 29 | C44H72NO10P | PS(38:7) | 8.993 | 806.51447 |
| 30 | C45H88NO10P | PS(39:0) | 12.229 | 834.59412 |
| 31 | C45H86NO10P | PS(39:1) | 8.735 | 832.57965 |
| 32 | C46H76NO10P | PS(40:7) | 9.252 | 834.49951 |
| 33 | C41H76NO9P | PS(O-35:3) | 10.86 | 758.54956 |
| 34 | C46H93N2O6P | SM(41:1;O2) | 14.643 | 801.68713 |
| 35 | C47H95N2O6P | SM(42:1;O2) | 14.839 | 815.69824 |

**Abbreviations:** AC, acyl carnitine; Cer, ceramide; DG, diglyceride; Hex2Cer, dihexosylceramide; HexCer, hexosylceramide; IPC, inositol phosphorylceramide; PC, phosphatidylcholine; PE, phosphatidylethanolamine; PE, phosphatidylethanolamine; PS, phosphatidylserine; SM, sphingomyelin.