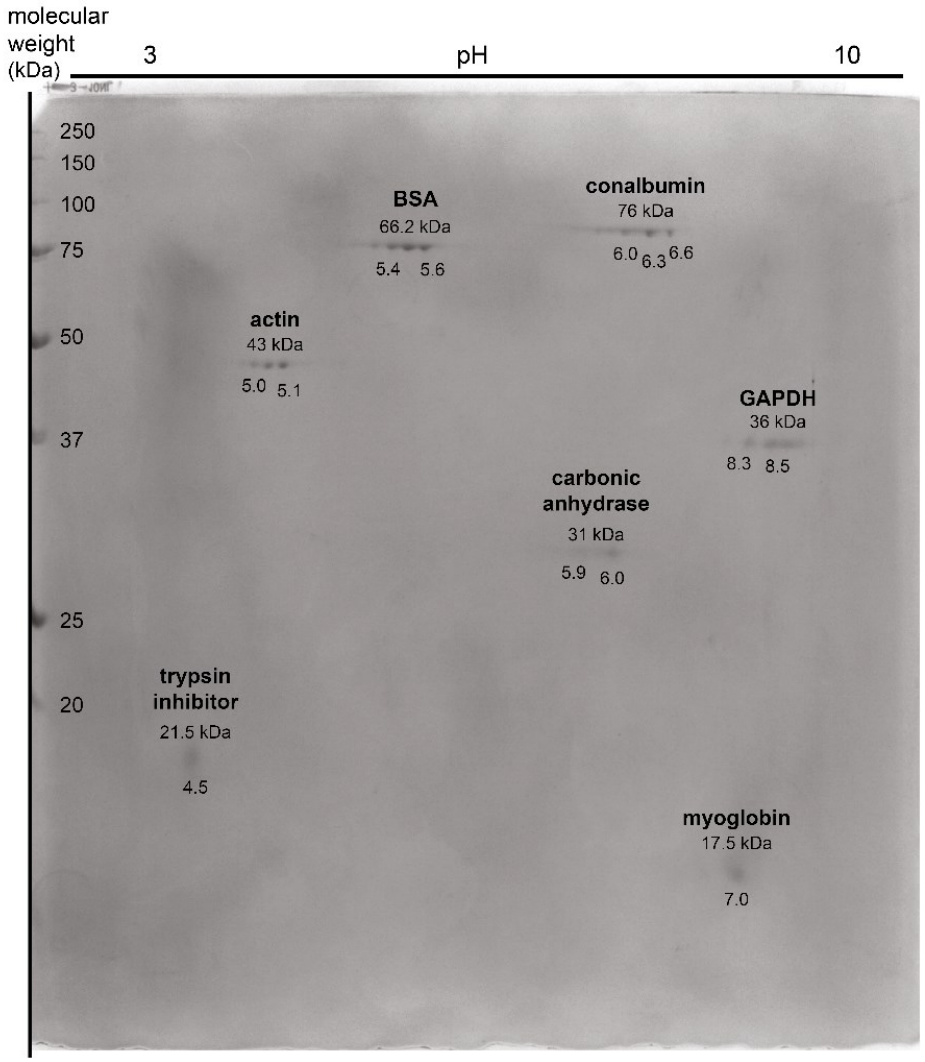

Fig. S1. Resolution of two-dimensional gel electrophoresis standards with the same parameters as liver samples
BSA – bovine serum albumin; GAPDH – glyceraldehyde-3-phosphate dehydrogenase

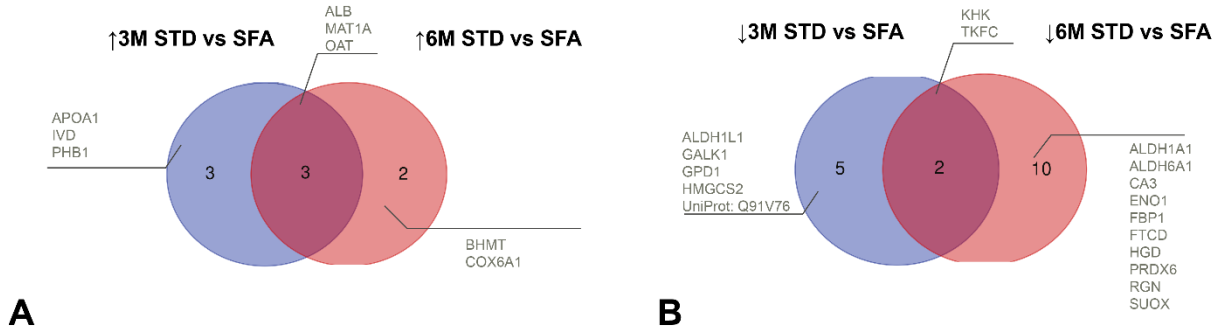

Fig S2. Venn diagrams of upregulated (A) and downregulated (B) mouse liver proteins after three (3M) and six months (6M) of provision of a standard diet (STD) or a high saturated fatty acid diet (SFA). APOA1 – apolipoprotein A1; IVD – isovaleryl-CoA dehydrogenase; PHB1 – prohibitin 1; ALB – albumin; MAT1A – S-adenosylmethionine synthase isoform type-1; OAT – ornithine aminotransferase, mitochondrial; BHMT – betaine-homocysteine S-methyltransferase; COX6A1 – cytochrome c oxidase subunit 6A1; ALDH1L1 –cytosolic 10-formyltetrahydrofolate dehydrogenase ; GALK1 – galactokinase; GPD1 – glycerol-3-phosphate dehydrogenase [NAD(+)], cytoplasmic; HMGCS2 – 3-hydroxy-3-methylglutaryl-CoA synthase; KHK – ketohexokinase; TKFC – triokinase/FMN cyclase; ALDH1A1 – aldehyde dehydrogenase 1A1; ALDH6A1 – aldehyde dehydrogenase family 6, subfamily A1; CA3 – carbonic anhydrase 3; ENO1 – alpha-enolase; FBP1 – fructose-1,6-bisphosphatase 1; FTCD – formimidoyltransferase-cyclodeaminase; HGD – homogentisate 1,2-dioxygenase; PRDX6 – peroxiredoxin-6; RGN – regucalcin; SUOX – sulfite oxidase, mitochondrial

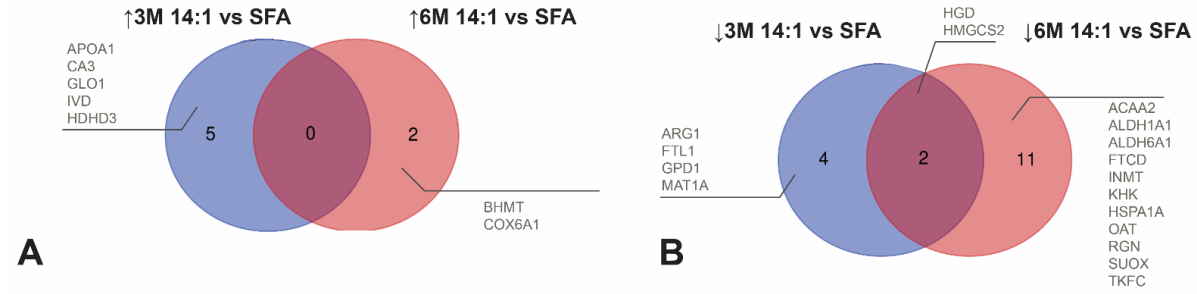

Fig S3. Venn diagrams of upregulated (A) and downregulated (B) mouse liver proteins after three (3M) and six months (6M) of provision of a high polyunsaturated fatty acid diet with an LA:ALA ratio of 14:1 (14:1) or a high saturated fatty acid diet (SFA). APOA1 – apolipoprotein A1; CA3 – carbonic anhydrase 3; GLO1 – lactoylglutathione lyase; IVD – isovaleryl-CoA dehydrogenase; HDHD3 – haloacid dehalogenase-like hydrolase domain-containing protein 3; BHMT – betaine-homocysteine S-methyltransferase; COX6A1 – cytochrome c oxidase subunit 6A1; ARG1 – arginase 1; FTL1 – ferritin light chain 1; GPD1 – glycerol-3-phosphate dehydrogenase [NAD(+)], cytoplasmic; MAT1A – S-adenosylmethionine synthase isoform type-1; HGD – homogentisate 1,2-dioxygenase; HMGCS2 – hydroxymethylglutaryl-CoA synthase, mitochondrial; ACAA2 – 3-ketoacyl-CoA thiolase, mitochondrial; ALDH1A1 – aldehyde dehydrogenase 1A1; ALDH6A1 – aldehyde dehydrogenase family 6 member A1; FTCD – formimidoyltransferase-cyclodeaminase; INMT – indolethylamine N-methyltransferase; KHK – ketohexokinase; HSPA1A – heat shock 70 kDa protein 1A; OAT – ornithine aminotransferase, mitochondrial; RGN – regucalcin; SUOX – sulfite oxidase, mitochondrial; TKFC – triokinase/FMN cyclase

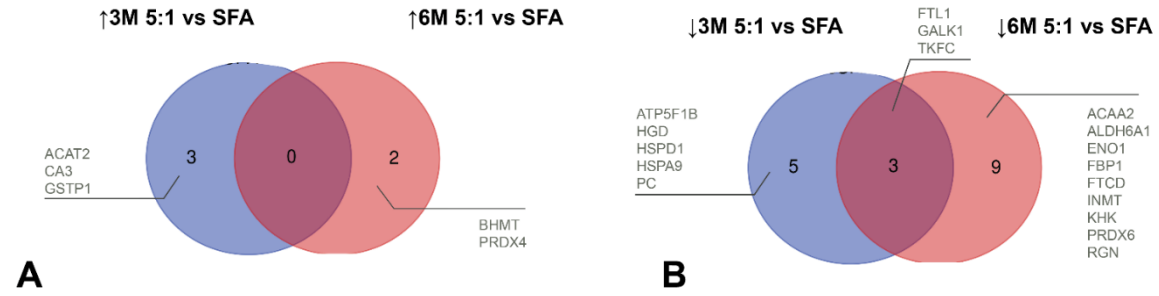

Fig. S4. Venn diagrams of upregulated (A) and downregulated (B) mouse liver proteins after three (3M) and six months (6M) of provision of a high polyunsaturated fatty acid diet with an LA:ALA ratio of 5:1 (5:1) or a high saturated fatty acid diet (SFA). ACAT2 – acetyl-CoA acetyltransferase, cytosolic; CA3 – carbonic anhydrase 3; GSTP1 – glutathione S-transferase P1; BHMT – betaine-homocysteine S-methyltransferase; PRDX4 – peroxiredoxin-4; ATP5F1B – ATP synthase subunit beta, mitochondrial; HGD – homogentisate 1,2-dioxygenase; HSPD1 – 60 kDa heat shock protein, mitochondrial; HSPA9 – stress-70 protein, mitochondrial; PC – pyruvate carboxylase, mitochondrial; FTL1 – ferritin light chain 1; GALK1 – galactokinase; TKFC – triokinase/FMN cyclase; ACAA2 – 3-ketoacyl-CoA thiolase, mitochondrial; ALDH6A1 – aldehyde dehydrogenase family 6 member A1; ENO1 – alpha-enolase; FBP1 – fructose-1,6-bisphosphatase 1; FTCD – formimidoyltransferase-cyclodeaminase; INMT – indolethylamine N-methyltransferase; KHK – ketohexokinase; PRDX6 – peroxiredoxin-6; RGN – regucalcin

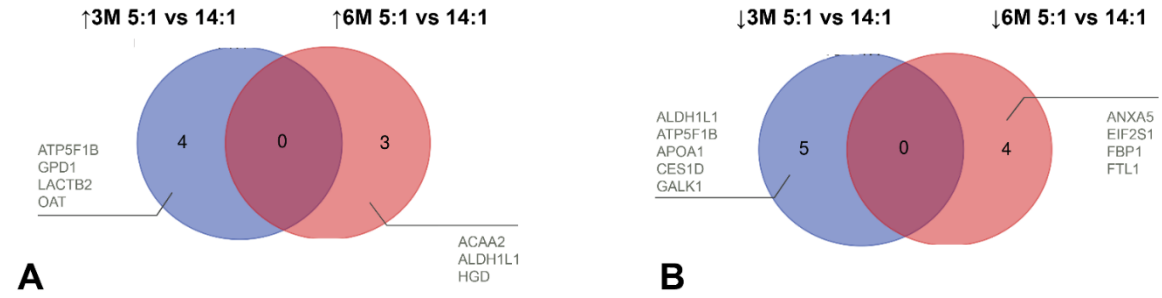

Fig. S5. Venn diagrams of upregulated (A) and downregulated (B) mouse liver proteins after three (3M) and six months (6M) of provision of a high polyunsaturated fatty acid diet with an LA:ALA ratio of 5:1 (5:1) or one with an LA:ALA ratio of 14:1 (14:1). ATP5F1B – ATP synthase subunit beta, mitochondrial; GPD1 – glycerol-3-phosphate dehydrogenase [NAD(+)], cytoplasmic; LACTB2 – endoribonuclease LACTB2; OAT – ornithine aminotransferase, mitochondrial; ACAA2 – 3-ketoacyl-CoA thiolase, mitochondrial; ALDH1L1 – cytosolic 10-formyltetrahydrofolate dehydrogenase ; HGD – homogentisate 1,2-dioxygenase; APOA1 – apolipoprotein A1; CES1D – carboxylesterase 1D; GALK1 – galactokinase; ANXA5 – annexin A5; EIF2S1 – eukaryotic translation initiation factor 2 subunit 1; FBP1 – fructose-1,6-bisphosphatase 1; FTL1 – ferritin light chain 1

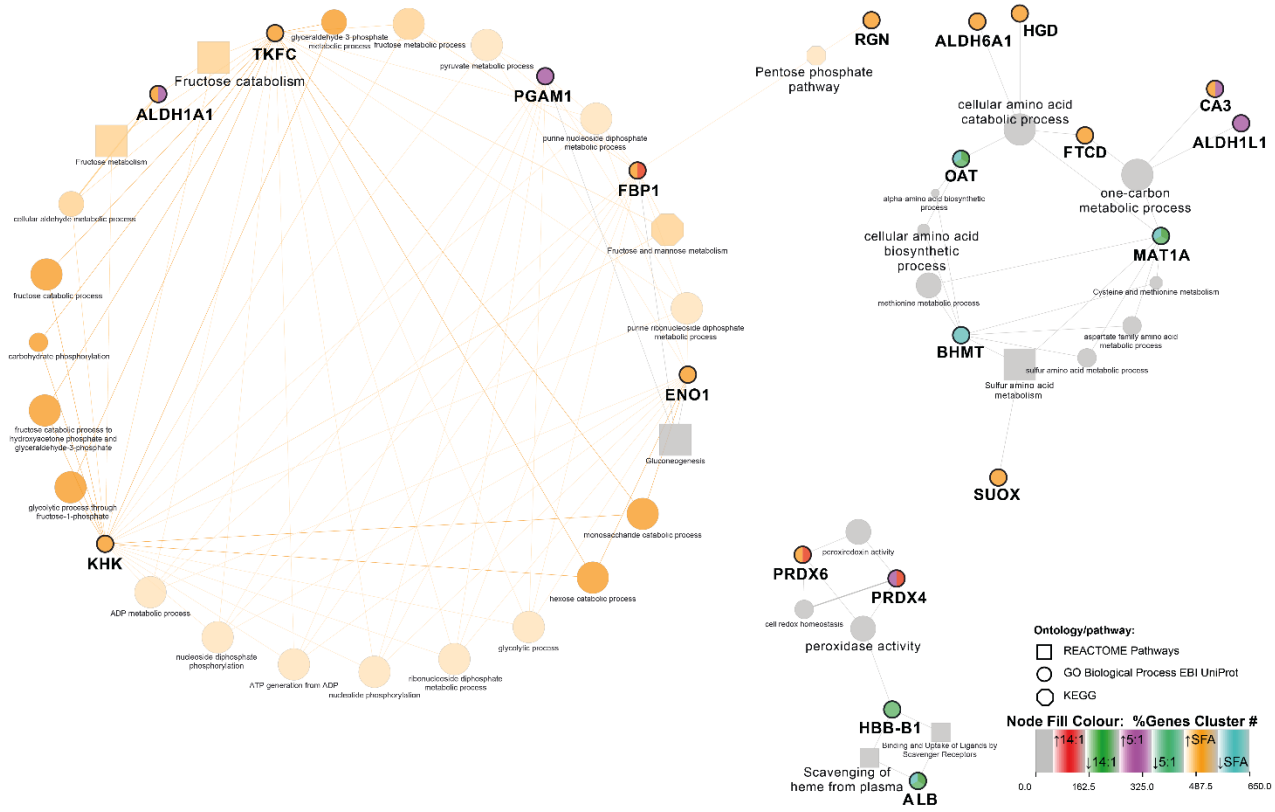

Fig. S6. Protein–protein interaction pathway networks of differentially expressed proteins in the mouse liver from groups fed a high saturated fatty acid diet (SFA), a high polyunsaturated fatty acid diet with an LA:ALA ratio of 14:1 (14:1) or one with an LA:ALA ratio of 5:1 (5:1) compared to those from a group fed a standard diet (STD). Node colour indicates a protein to be upregulated (↑) or downregulated (↓) relative to its counterpart in the STD group and in which group(s) it was so. KHK – ketohexokinase; ALDH1A1 – aldehyde dehydrogenase 1A1; TKFC – triokinase/FMN cyclase; PGAM1 – phosphoglycerate mutase 1; FBP1 – fructose-1,6-bisphosphatase 1; ENO1 – alpha-enolase; PRDX6 – peroxiredoxin-6; PRDX4 – peroxiredoxin-4; HBB-B1 – haemoglobin subunit beta-1; ALB – albumin; RGN – regucalcin; ALDH6A1 – aldehyde dehydrogenase family 6 member A1; HGD – homogentisate 1,2-dioxygenase; BHMT – betaine-homocysteine S-methyltransferase; OAT – ornithine aminotransferase, mitochondrial; SUOX – sulfite oxidase, mitochondrial; FTCD – formimidoyltransferase-cyclodeaminase; MAT1A – S-adenosylmethionine synthase isoform type-1; CA3 – carbonic anhydrase 3; ALDH1L1 – cytosolic 10-formyltetrahydrofolate dehydrogenase; GO – Gene Ontology knowledgebase; KEGG – Kyoto Encyclopaedia of Genes and Genomes

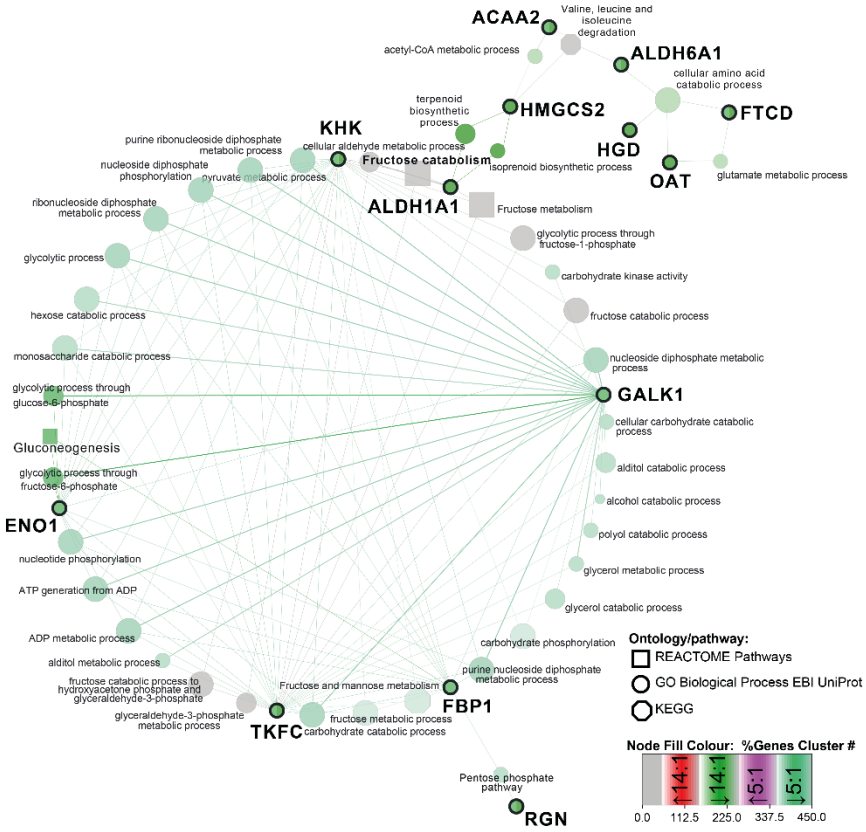

Fig. S7. Protein–protein interaction pathway networks of differentially expressed proteins in the mouse liver from groups fed a high polyunsaturated fatty-acid diet with an LA:ALA ratio of 14:1 (14:1) or one with an LA:ALA ratio of 5:1 (5:1) compared to those from a group fed a high saturated fatty acid diet (SFA). Node colour indicates a protein to be upregulated (←) or downregulated (→) relative to its counterpart in the SFA group and in which group(s) it was so. ENO1 – alpha-enolase; TKFC – triokinase/FMN cyclase; KHK – ketohexokinase; FBP1 – fructose-1,6-bisphosphatase 1; RGN – regucalcin; ALDH1A1 – aldehyde dehydrogenase 1A1; HMGCS2 – hydroxymethylglutaryl-CoA synthase, mitochondrial; GALK1 – galactokinase; ACAA2 – 3-ketoacyl-CoA thiolase, mitochondrial; HGD – homogentisate 1,2-dioxygenase; ALDH6A1 – aldehyde dehydrogenase family 6, subfamily A1; OAT – ornithine aminotransferase, mitochondrial; FTCD – formimidoyltransferase-cyclodeaminase; GO – Gene Ontology knowledgebase; KEGG – Kyoto Encyclopaedia of Genes and Genomes

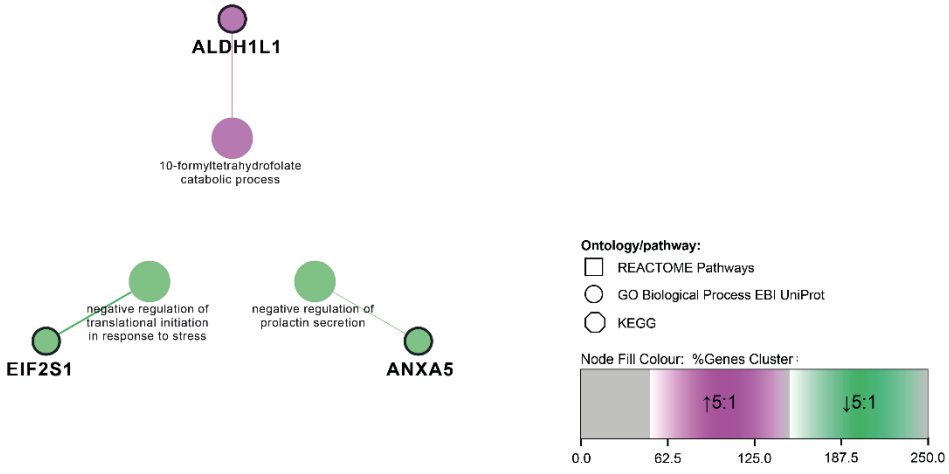

Fig. S8. Protein–protein interaction pathway networks of differentially expressed proteins in the mouse liver from a group fed a high polyunsaturated fatty acid diet with an LA:ALA ratio of 5:1 (5:1) compared to those from a group fed one with an LA:ALA ratio of 14:1 (14:1). Node colour indicates a protein to be upregulated (↑) or downregulated (↓) relative to its counterpart in the group on the diet with the 14:1 ratio. EIF2S1 – eukaryotic translation initiation factor 2 subunit 1; ALDH1L1 – cytosolic 10-formyltetrahydrofolate dehydrogenase; ANXA5 – annexin A5; GO – Gene Ontology knowledgebase; KEGG – Kyoto Encyclopaedia of Genes and Genomes

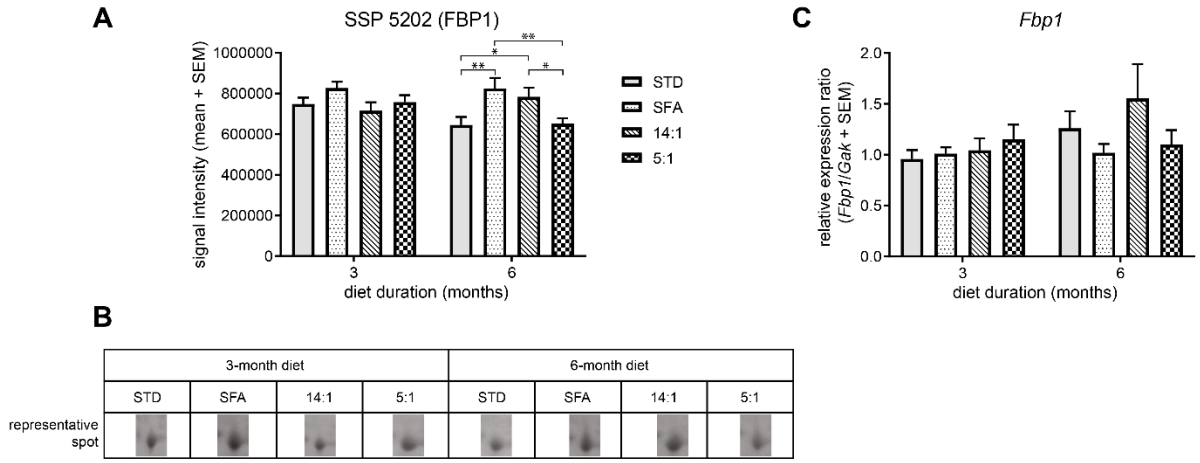

Fig. S9. Fructose-1,6-bisphosphatase 1 (FBP1) expression in the mouse liver from groups fed one alternative of four diets: a standard one (STD), a high saturated fatty acid diet (SFA), a high polyunsaturated fatty acid diet with an LA:ALA ratio of 14:1 (14:1) or one with an LA:ALA ratio of 5:1 (5:1). A) Expression at the protein level based on two-dimensional gel electrophoresis (2DE) (result of 3-month diet provision from (30), n = 8); B) Representative 2DE protein spot SSP 5202; C) Transcript level of *Fbp1* (n = 6). SEM – standard error of the mean; * – P-value < 0.05; ** P-value < 0.01

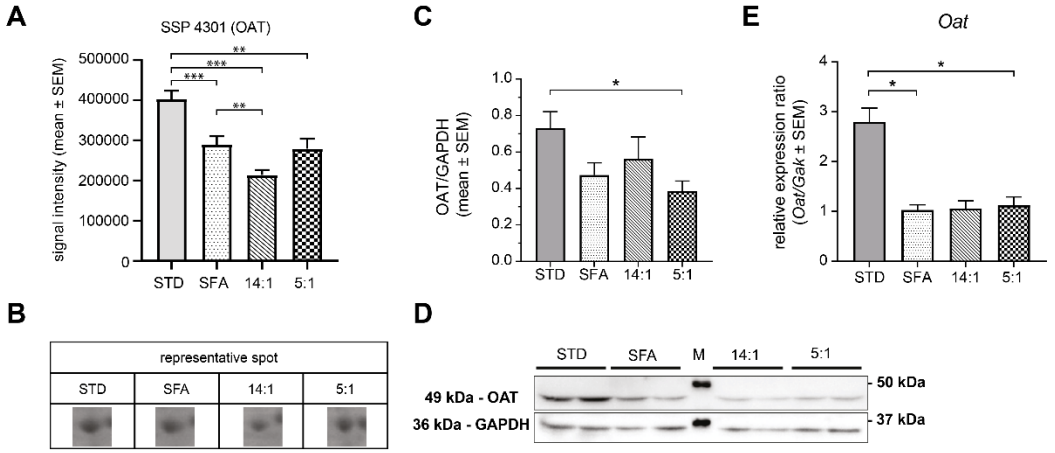

Fig. S10. Mitochondrial ornithine aminotransferase (OAT) expression in the mouse liver from groups fed one alternative of four diets for six months: a standard one (STD), a high saturated fatty acid diet (SFA), a high polyunsaturated fatty acid diet with an LA:ALA ratio of 14:1 (14:1) or one with an LA:ALA ratio of 5:1 (5:1). A) Expression at the protein level based on two-dimensional gel electrophoresis (2DE) (n = 8); B) Representative 2DE protein spot SSP 4301; C) Quantitation data of OAT/glyceraldehyde-3-phosphate dehydrogenase (GAPDH) protein level (Western blotting) (n = 8), the output from one-way ANOVA with Tukey's multiple comparisons test; D) Representative immunoblot; E) Transcript level of *Oat* (n = 6). SEM – standard error of the mean; * – P-value < 0.05; ** – P-value < 0.01; *** – P-value < 0.001

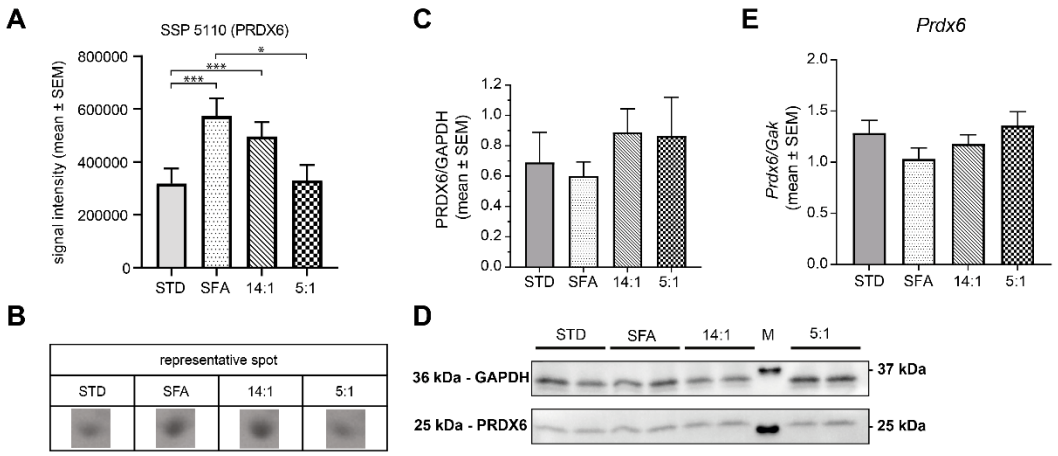

Fig. S11. Peroxiredoxin-6 (PRDX6) expression in the mouse liver from groups fed one alternative of four diets for six months: a standard one (STD), a high saturated fatty acid diet (SFA), a high polyunsaturated fatty acid diet with an LA:ALA ratio of 14:1 (14:1) or one with an LA:ALA ratio of 5:1 (5:1). A) Expression at the protein level based on two-dimensional gel electrophoresis (2DE) (n = 8); B) Representative 2DE protein spot SSP 5110; C) Quantitation data of PRDX6/glyceraldehyde-3-phosphate dehydrogenase (GAPDH) protein level (Western blotting) (n = 6), the output from one-way ANOVA with Tukey's multiple comparisons test; D) Representative immunoblot; E) Transcript level of *Prdx6* (n = 6). SEM – standard error of the mean; * – P-value < 0.05; ** – P-value < 0.01; *** – P-value < 0.001

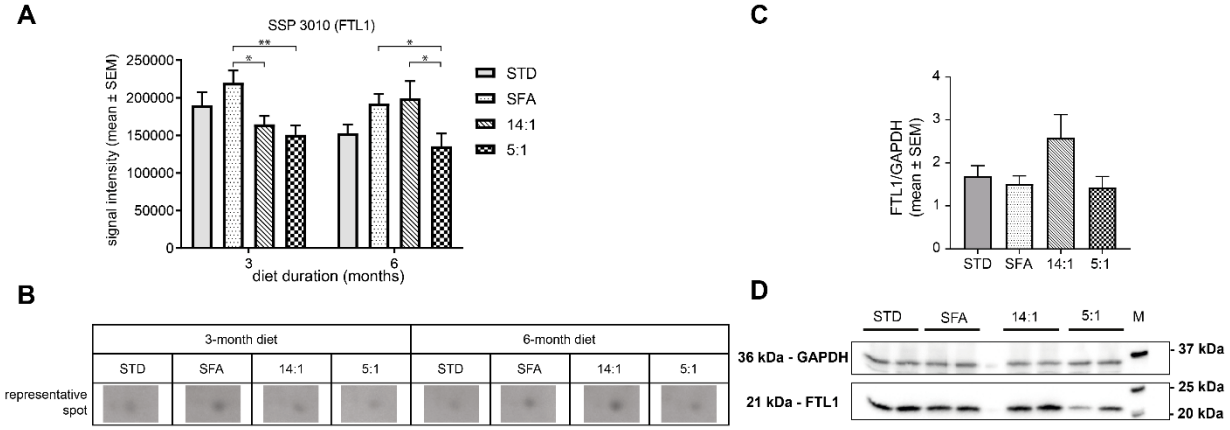

Fig. S12. Ferritin light chain 1 (FTL1) expression in the mouse liver from groups fed one alternative of four diets: a standard one (STD), a high saturated fatty acid diet (SFA), a high polyunsaturated fatty acid diet with an LA:ALA ratio of 14:1 (14:1) or one with an LA:ALA ratio of 5:1 (5:1). A) Expression at the protein level based on two-dimensional gel electrophoresis (2DE) (result of 3-month diet provision from (30), n = 8); B) Representative 2DE protein spot SSP 3010; C) Quantitation data of FTL1/glyceraldehyde-3-phosphate dehydrogenase (GAPDH) protein level (Western blotting) after 6 months of diet (n = 6); D) Representative immunoblot. SEM – standard error of the mean; * – P-value < 0.05; ** – P-value < 0.01

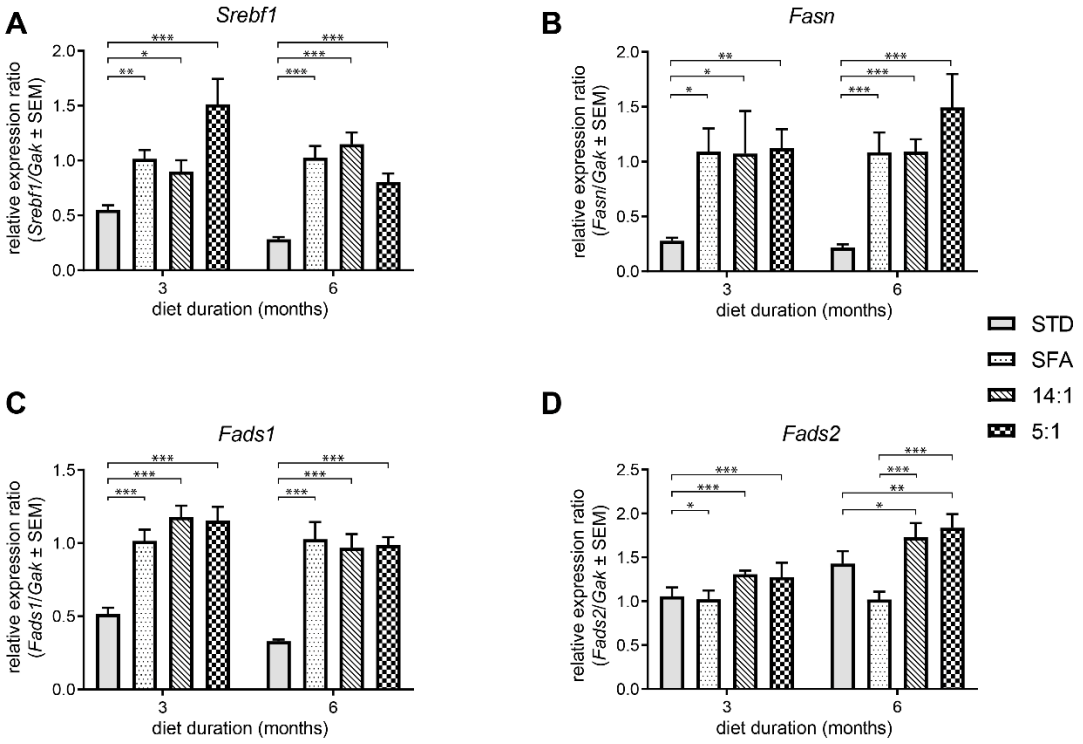

Fig. S13. Transcript level of A) *Srebf1* (sterol regulatory element binding transcription factor 1 transcript); B) *Fasn* (fatty acid synthase); C) *Fads1* (fatty acid desaturase 1); and D) *Fads2* (fatty acid desaturase 2). Estimations were in mouse liver from groups fed one alternative of four diets for three and six months: a standard one (STD), a high saturated fatty acid diet (SFA), a high polyunsaturated fatty acid diet with an LA:ALA ratio of 14:1 (14:1) or one with an LA:ALA ratio of 5:1 (5:1) (result of 3-month diet provision from (30). Significance of differences was estimated using the model described in the chapter Material and Methods: Statistical analysis. SEM – standard error of the mean; * – P-value < 0.05; ** – P-value < 0.01; *** – P-value < 0.001