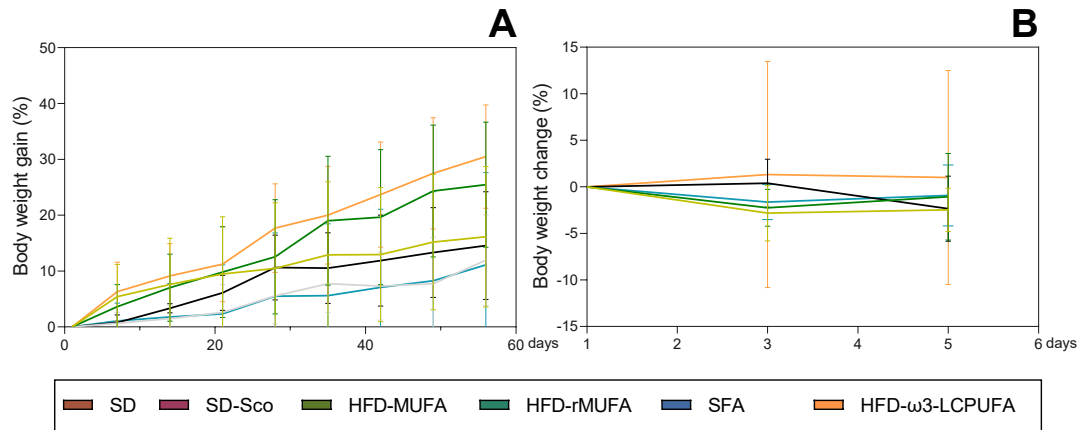


Supplementary Material-Table S1. Fatty acid composition of dietary lipid sources used in the study. Data are

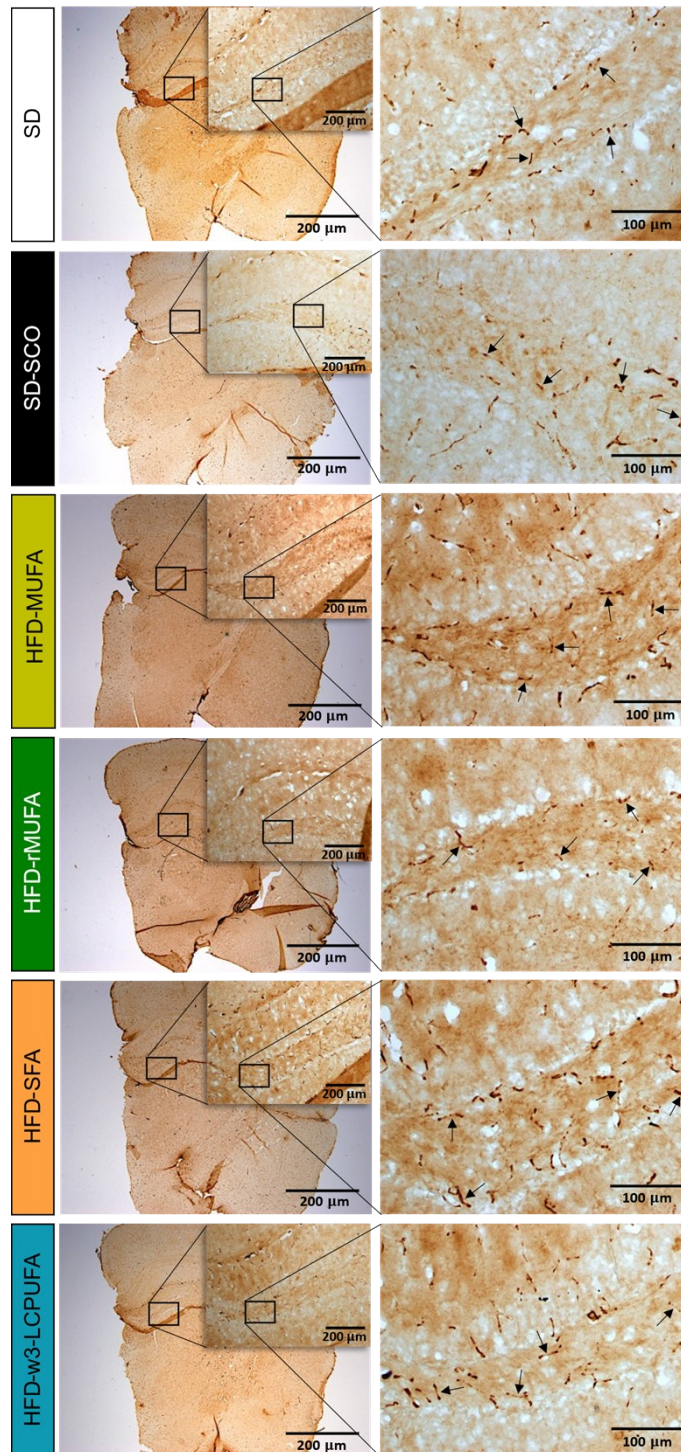
Fatty acid	RPO	EVOO	ROO	ω3-LCPUFA
<i>Lauric acid (C12:0)</i>	0.43 ± 0.01	n.d.	n.d.	n.d.
<i>Myristic acid (C14:0)</i>	1.48 ± 0.01	0.09 ± 0.01	0.10 ± 0.02	0.08 ± 0.00
<i>Palmitic acid (C16:0)</i>	41.11 ± 0.93	15.93 ± 0.12	15.71 ± 0.38	9.99 ± 0.29
<i>14-methylpentadecanoic acid (Iso-C16:0)</i>	0.36 ± 0.04	0.15 ± 0.03	0.15 ± 0.01	0.12 ± 0.01
<i>Palmitoleic acid (C16:1ω7)</i>	0.87 ± 0.04	2.23 ± 0.00	1.97 ± 0.01	1.31 ± 0.15
<i>Margaric acid (C17:0)</i>	0.13 ± 0.03	n.d.	n.d.	n.d.
<i>Stearic acid (C18:0)</i>	6.07 ± 0.22	3.32 ± 0.09	4.40 ± 0.27	3.29 ± 0.07
<i>Oleic acid (C18:1ω9)</i>	36.65 ± 0.44	68.53 ± 0.01	65.78 ± 0.67	38.94 ± 0.02
<i>Linoleic acid (C18:2ω6)</i>	11.59 ± 0.29	7.34 ± 0.23	10.08 ± 0.02	6.82 ± 0.12
<i>γ-Linolenic acid (C18:3ω6γ)</i>	n.d.	n.d.	n.d.	0.10 ± 0.03
<i>α-linolenic acid (C18:3ω3α)</i>	0.49 ± 0.05	1.45 ± 0.02	0.93 ± 0.08	0.53 ± 0.05
<i>Arachidic acid (C20:0)</i>	0.31 ± 0.05	0.28 ± 0.02	0.23 ± 0.03	0.88 ± 0.04
<i>Gondoic acid (C20:1ω9)</i>	n.d.	0.32 ± 0.02	0.23 ± 0.03	0.15 ± 0.00
<i>Eicosadienoic acid (C20:2ω6)</i>	0.52 ± 0.02	n.d.	n.d.	0.15 ± 0.00
<i>Dihomo-γ-linolenic acid (C20:3ω6)</i>	n.d.	n.d.	n.d.	0.05 ± 0.01
<i>Eicosatrienoic acid (C20:3ω3)</i>	n.d.	0.25 ± 0.06	0.24 ± 0.01	0.15 ± 0.00
<i>Arachidonic acid (C20:4ω6)</i>	n.d.	0.11 ± 0.01	0.07 ± 0.02	0.77 ± 0.07
<i>Eicosapentaenoic acid (C20:5ω3)</i>	n.d.	n.d.	n.d.	19.17 ± 0.65
<i>Behenic acid (C22:0)</i>	n.d.	n.d.	n.d.	0.27 ± 0.04
<i>Docosapentaenoic acid (C22:5ω3)</i>	n.d.	n.d.	n.d.	1.25 ± 0.09
<i>Docosahexaenoic acid (C22:6ω3)</i>	n.d.	n.d.	n.d.	15.55 ± 0.28
<i>Tricosanoic acid (C23:0)</i>	n.d.	n.d.	n.d.	0.40 ± 0.07
<i>Total saturated fatty acids</i>	49.89 ± 0.72	19.77 ± 0.07	20.61 ± 0.70	15.03 ± 0.21
<i>Total monounsaturated fatty acids</i>	37.52 ± 0.36	71.07 ± 0.06	68.05 ± 0.62	40.41 ± 0.11
<i>Total polyunsaturated fatty acids</i>	12.60 ± 0.36	9.16 ± 0.14	11.33 ± 0.08	44.55 ± 0.32
<i>Omega-3</i>	0.49 ± 0.05	1.71 ± 0.06	1.17 ± 0.08	36.66 ± 0.42
<i>Omega-6</i>	12.11 ± 0.27	7.45 ± 0.22	10.16 ± 0.02	7.89 ± 0.11
<i>Omega-6/omega-3 ratio</i>	24.71 ± 2.49	4.37 ± 0.17	8.68 ± 0.50	0.22 ± 0.01

expressed as % of total identified fatty acids (mean ± SD, *n* = 3 technical replicates per oil).

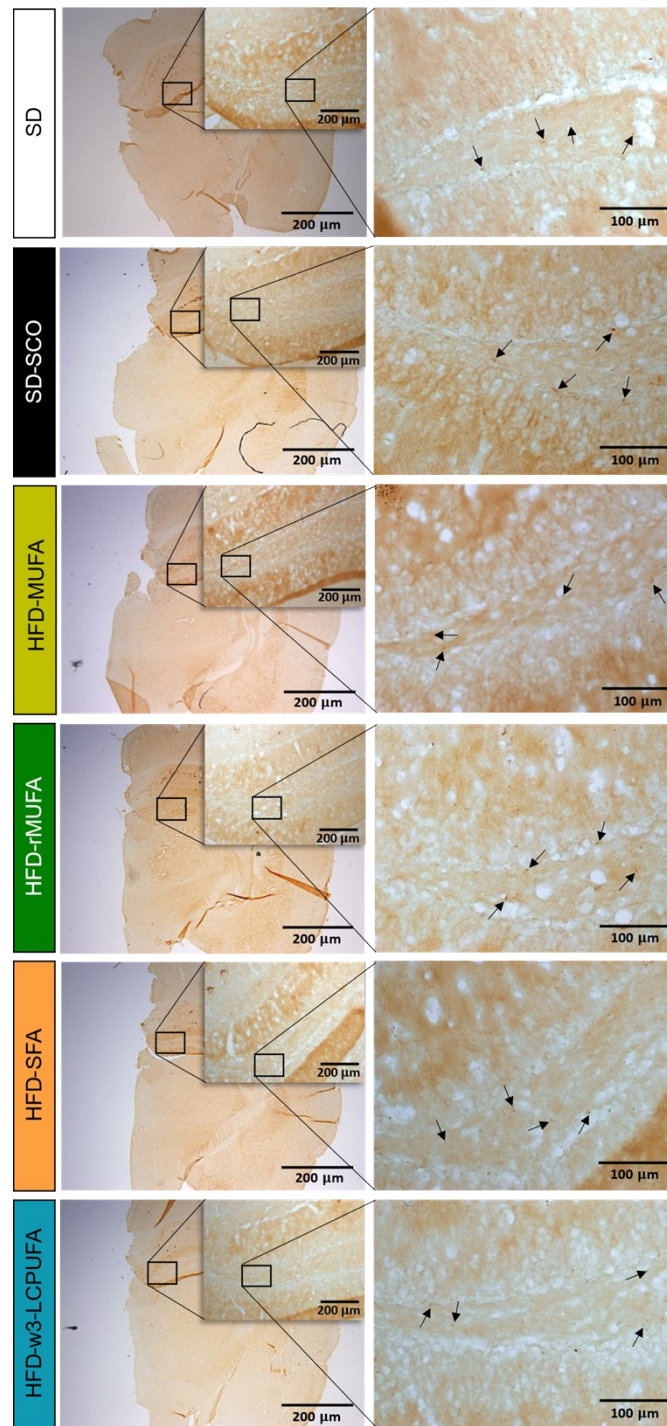
RPO, refined palm oil; EVOO, extra-virgin olive oil; ROO, refined olive oil; ω3-LCPUFA, omega-3 long-chain polyunsaturated fatty acids



Supplementary Material-Figure S1. Body-weight trajectories diverge with dietary fat quality over 10 weeks, with distinct patterns during scopolamine induction. (A) Weekly body weight during the dietary intervention before scopolamine for SD, HFD-MUFA (EVOO), HFD-rMUFA (ROO), HFD-SFA, and HFD- ω 3-LCPUFA. The SFA diet produced the largest gain, refined MUFA an intermediate profile, EVOO-MUFA attenuated weight gain relative to ROO, and ω 3-LCPUFA blunted gain toward SD values. (B) Body weight during the scopolamine induction week (three i.p. injections on alternating days). High-fat groups show partial weight recovery, whereas SD-Scop displays a more persistent loss. Data are mean \pm SD ($n = 8-10$ per group). One-way ANOVA with Tukey's post hoc at week 10.



Supplementary Material-Figure S2. Representative immunohistochemistry for TNF- α in dentate gyrus across dietary groups. Low-magnification overviews with inset and high-magnification regions of interest (ROIs) for TNF- α staining in SD, SD-SCO, HFD-MUFA (EVOO), HFD-rMUFA (ROO), HFD-SFA (RPO), and HFD- ω 3-LCPUFA. Sections were processed with ABC/DAB under identical acquisition settings; images were selected from anatomically matched dentate-gyrus levels and collected blinded to group. Arrows indicate representative TNF- α -positive profiles within the dentate gyrus (brown DAB signal). Scale bars: 200 μ m (overview), 100 μ m (insets).



Supplementary Material-Figure S3. Representative immunohistochemistry for COX-2 in dentate gyrus across dietary groups. Low-magnification overviews with inset and high-magnification ROIs for COX-2 staining in SD, SD-Scop, HFD-MUFA (EVOO), HFD-rMUFA (ROO), HFD-SFA (RPO), and HFD- ω 3-LCPUFA. Sections were processed with ABC/DAB under identical acquisition settings; images were selected from anatomically matched dentate-gyrus levels and collected blinded to group. Arrows indicate representative COX-2-positive profiles within the dentate gyrus (brown DAB signal). Scale bars: 200 μ m (overview), 100 μ m (insets).

