

Supplemental Table S4. Brain Parameters in ND-Fed Rats versus HFD-Fed Rats

Brain parameter	ND	HFD	P value
Mitochondrial metabolism at week 28			
PGC-1 α protein expression	0.70 \pm 0.04	0.47 \pm 0.06	0.0010
p-AMPK/Total AMPK protein expression	0.92 \pm 0.02	0.95 \pm 0.01	NS
Insulin signaling at week 28			
p-IRS/Total IRS expression	0.93 \pm 0.07	0.55 \pm 0.53	0.0015
p-AKT/Total AKT protein expression	0.67 \pm 0.11	0.83 \pm 0.07	NS
Mitochondrial dynamics at week 28			
MFN1 protein expression	0.83 \pm 0.04	0.67 \pm 0.02	0.0077
MFN2 protein expression	0.91 \pm 0.08	0.71 \pm 0.04	0.0491
OPA1 protein expression	0.76 \pm 0.06	0.67 \pm 0.03	NS
p-DRP1 ^{ser616} /total DRP1 protein expression	0.81 \pm 0.05	0.90 \pm 0.04	NS
Mitophagy at week 28			
PINK1/Parkin protein expression	0.79 \pm 0.05	1.39 \pm 0.08	0.0001
Autophagy at week 28			
Beclin-1 protein expression	1.03 \pm 0.02	0.73 \pm 0.02	<0.0001
LC3-II protein expression	0.96 \pm 0.02	0.72 \pm 0.03	0.0002
p62 protein expression	0.97 \pm 0.03	0.79 \pm 0.03	0.0005
Apoptosis at week 28			
Bax/Bcl-2 protein expression	0.73 \pm 0.04	1.27 \pm 0.06	<0.0001
Cleaved caspase 3/Procaspase 3 protein expression	0.50 \pm 0.03	0.95 \pm 0.09	0.0010
Antioxidant at week 28			
GPX4 protein expression	1.08 \pm 0.05	0.81 \pm 0.03	0.0008
SOD2 protein expression	1.01 \pm 0.05	0.73 \pm 0.04	NS
Oxidative stress at week 28			
ROS level, arbitrary unit	91.23 \pm 9.17	276.93 \pm 11.28	<0.0001
MDA level, mmol/g protein	196.05 \pm 39.61	392.44 \pm 24.01	0.0017
Inflammation at week 28			
TNF- α protein expression	0.68 \pm 0.07	0.77 \pm 0.01	NS
p-NF κ B/Total NF κ B protein expression	0.83 \pm 0.04	0.86 \pm 0.03	NS
Blood brain barrier at week 28			
Claudin-5 protein expression	0.98 \pm 0.06	0.57 \pm 0.06	0.0004
Synapse at week 28			
Synaptophysin protein expression	0.96 \pm 0.03	0.72 \pm 0.04	0.0005
PSD-95 protein expression	0.92 \pm 0.03	0.87 \pm 0.04	0.0371
Neurogenesis at week 28			
p-TrkB/Total TrkB protein expression	0.77 \pm 0.06	0.52 \pm 0.04	0.0077
BDNF protein expression	0.91 \pm 0.08	0.65 \pm 0.08	0.0462
DCX protein expression	0.81 \pm 0.04	0.90 \pm 0.06	NS

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Supplemental Table S4. Continued

Brain parameter	ND	HFD	P value
Alzheimer's disease marker at week 28			
p-Tau/Total Tau protein expression	1.16±0.07	1.43±0.06	0.0250
APP protein expression	0.91±0.03	1.18±0.02	<0.0001
A β protein expression	0.43±0.06	0.62±0.07	0.0431
BACE-1 protein expression	0.89±0.06	1.19±0.05	0.0027
Anti-aging marker at week 28			
sRAGE protein expression	0.87±0.02	0.75±0.01	0.0002
Behavior at week 28			
Anxiety-like behavior; time in central zone, sec	29.10±9.06	25.77±3.64	NS
%Preference index of novel location	55.29±2.08	34.10±2.25	<0.0001
%Preference index of novel recognition	55.42±1.62	38.06±1.42	<0.0001

Values are expressed as mean \pm standard error of the mean ($n=8$ per group). Week 12, baseline; Week 28, follow-up. All protein expressions are normalized to the expression of housekeeping proteins.

ND, normal diet-fed rats; HFD, high-fat diet-fed rats; PGC-1 α , peroxisome proliferator-activated receptor gamma coactivator-1 α ; p-AMPK, phosphorylated-activated protein kinase; AMPK, activated protein kinase; NS, no significance; p-IRS, phosphorylated-insulin receptor substrate 1; IRS, insulin receptor substrate 1; MFN1, mitofusin 1; MFN2, mitofusin 2; OPA1, optic atrophy 1; p-DRP1^{ser616}, phosphorylated-dynamin-related at serine⁶¹⁶; DRP1, dynamin-related protein 1; PINK1, PTEN-induced kinase 1; LC3-II, light chain 3-II; Bax/Bcl, Bcl-2-associated X protein/B-cell lymphoma; GPX4, glutathione peroxidase 4; SOD2, superoxide dismutase 2; ROS, reactive oxygen species; MDA, malondialdehyde; TNF- α , tumor necrosis factor- α ; p-NF κ B, phosphorylated-nuclear factor kappa-light-chain-enhancer of activated B cells; NF κ B, nuclear factor kappa-light-chain-enhancer of activated B cells; PSD-95, postsynaptic density protein 95; p-TrkB, phosphorylated-tropomyosin receptor kinase B; TrkB, tropomyosin receptor kinase B; BDNF, brain-derived neurotrophic factor; DCX, doublecortin; p-Tau, phosphorylated-Tau; APP, amyloid-beta precursor protein; A β , amyloid β ; BACE-1, beta-site amyloid precursor protein cleaving enzyme 1; sRAGE, soluble-receptor for advanced glycation end product.