Supplementary Table 1 qPCR primer sequences for hippocampus

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Gene |  | Sequence (5’–3’) | Accession number |  |
|  |  |  |  |  |  |
|  | *Ampa1* | Forward | AAAAAGGAGAGGCTGGTGGT | NM\_001113325 |  |
|  |  | Reverse | CGATGCCGTTCTTTTCTAGC |  |  |
|  | *Activin βA* | Forward | GAGGAAATGGGCTTAAAGGG | X69619 |  |
|  |  | Reverse | TGCTGGACACTGGAAAGATG |  |  |
|  | *Bdnf* | Forward | GTGGTGTAAGCCGCAAAGA | NM\_001048139 |  |
|  |  | Reverse | AACCATAGTAAGGAAAAGGATGGTC |  |  |
|  | *eNos* | Forward | GGCTCCCTCCTTCCGGCTG | NM\_008713 |  |
|  |  | Reverse | TCCCGCAGCACGCCGAT |  |  |
|  | *Gdnf* | Forward | TCCAACTGGGGGTCTACG | NM\_001301332 |  |
|  |  | Reverse | GACATCCCATAACTTCATCTTAGAGTC |  |  |
|  | *Gfra1* | Forward | GCGTGTGAAGCACTGAAGTC | NM\_010279 |  |
|  |  | Reverse | GGTTCAGTTCCGACCCAAC |  |  |
|  | *Gp91phox* | Forward | TGGGATCACAGGAATTGTCA | NM\_007807 |  |
|  |  | Reverse | CTTCCAAACTCTCCGCAGTC |  |  |
|  | *IL-6* | Forward | CCACTTCACAAGTCGGAGGCTTA | NM\_031168 |  |
|  |  | Reverse | GCAAGTGCATCATCGTTGTTCATAC |  |  |
|  | *iNos* | Forward | GTCACCTACCGCACCCGAG | NM\_010927 |  |
|  |  | Reverse | GCCACTGACACTTCGCACAA |  |  |
|  | *Ngf* | Forward | TCTATACTGGCCGCAGTGAG | NM\_001112698 |  |
|  |  | Reverse | GGACATTGCTATCTGTGTACGG |  |  |
|  | *Ngfr* | Forward | ACTGAGCGCCAGTTACGC | NM\_033217 |  |
|  |  | Reverse | CGTAGACCTTGTGATCCATCG |  |  |
|  | *Mcp-1* | Forward | TTAACGCCCCACTCACCTGCTG | NM\_011333 |  |
|  |  | Reverse | GCTTCTTTGGGACACCTGCTGC |  |  |
|  | *p22phox* | Forward | TGGCTACTGCTGGACGTTTCAC | NM\_007806 |  |
|  |  | Reverse | CTCCAGGAGACAGATGAGCACAC |  |  |
|  | *p47phox* | Forward | GTCCCTGCATCCTATCTGGA | NM\_001286037 |  |
|  |  | Reverse | GGGACATCTCGTCCTCTTCA |  |  |
|  | *p67phox* | Forward | CAGACCCAAAACCCCAGAAA | NM\_010877 |  |
|  |  | Reverse | AGGGTGAATCCGAAGCTCAA |  |  |
|  | *Tnf-α* | Forward | CGAGTGACAAGCCTGTAGCC | NM\_013693 |  |
|  |  | Reverse | GGTGAGGAGCACGATGTCG |  |  |
|  | *TrkB* | Forward | TGCCCAGAGCAGGATAAGAT | NM\_001025074 |  |
|  |  | Reverse | AAAGTCCTTGCGTGCATTGT |  |  |
|  | *Vesl-1S* | Forward | TTCACAGGAATCAGCAGGAG | AB019478 |  |
|  |  | Reverse | TGTGTCACATCGGGTGTTCT |  |  |
|  |  |  |  |  |  |

Supplementary Table 2 qPCR Primer sequences for liver

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Gene |  | Sequence (5’–3’) | Accession number |  |
|  |  |  |  |  |  |
|  | *Acc* | Forward | TGCCTATGAACTCAACAGCG | NM\_133360 |  |
|  |  | Reverse | ACATTCTGTTTAGCGTGGGG |  |  |
|  | *Acox1* | Forward | GACCTTCACTTGGGCATGTT | NM\_015729 |  |
|  |  | Reverse | AGCCTCGAAGATGAGTTCCA |  |  |
|  | *Cd36* | Forward | TTGAAAAGTCTCGGACATTGAG | NM\_001159558 |  |
|  |  | Reverse | TCAGATCCGAACACAGCGTA |  |  |
|  | *Cpt2* | Forward | GATGACTTCCCGATGAAGGA | NM\_009949 |  |
|  |  | Reverse | CAGTGCCATCTTTGGCTACA |  |  |
|  | *Gck* | Forward | AAAGATGTTGCCCACCTACG | NM\_010292 |  |
|  |  | Reverse | GCATCACCCTGAAGTTGGTT |  |  |
|  | *Foxo1* | Forward | AACCAGCTCAAATGCTAGTACCATC | NM\_019739 |  |
|  |  | Reverse | CAGAAGGTTCTCCATGTTTTTCTGGA |  |  |
|  | *Fasn* | Forward | CCCTTGATGAAGAGGGATCA | NM\_007988 |  |
|  |  | Reverse | CAAGGCGTTAGGGTTGACAT |  |  |
|  | *Ldlr* | Forward | AACCTGAAGAATGTGGTGGC | NM\_001252658 |  |
|  |  | Reverse | TCAGGGCGCTGTAGATCTTT |  |  |
|  | *Lrp1* | Forward | CCGCATCTTCTTCAGTGACA | NM\_008512 |  |
|  |  | Reverse | ACAGAGCCCACATTTTCCAC |  |  |
|  | *Pparα* | Forward | ACCCAAACTCCACTGCAAAC | NM\_011144 |  |
|  |  | Reverse | AAAGATGTCCCAGTGCCTTG |  |  |
|  | *Slc2a2* | Forward | CTGCAGAATTCCGGAAGAAG | NM\_031197 |  |
|  |  | Reverse | TCTCTGAAGACGCCAGGAAT |  |  |
|  | *Srebp1c* | Forward | GCAGCCACCATCTAGCCTG | NM\_011480 |  |
|  |  | Reverse | CAGCAGTGAGTCTGCCTTGAT |  |  |
|  |  |  |  |  |  |

Supplemental Table 3 Two-way ANOVA results for comparisons of the body weight, food and water intakes, and preference ratios

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | The number of mice | | | Old control vs. Young control mice | | | Old control vs. GPC-fed control mice | | |  |
|  |  |  | Young | Old | GPC | Degree of freedom | *F* values | *p* values | Degree of freedom | *F* values | *p* values |  |
|  | Basic indexs | Body weight |  | 10-16 | 9-12 |  |  |  | 1, 229 | 4.844 | 0.029 |  |
|  |  | Food intake |  |  |  | 1, 68 | 4.831 | 0.031 |  |
|  |  | Water intake |  |  |  | 1, 68 | 12.93 | 0.001 |  |
|  | Preference ratios | NaCl | 10 | 7 | 7 | 1, 95 | 4.486 | 0.037 | 1, 83 | 2.685 | 0.105 |  |
|  |  | Denatonium | 10 | 7-8 | 8 | 1, 75 | 6.756 | 0.011 | 1, 60 | 0.960 | 0.331 |  |
|  |  | Citric acid | 10 | 6 | 7 | 1, 42 | 0.005 | 0.943 | 1, 33 | 2.506 | 0.123 |  |

Supplemental Table 4 List of *p* values for comparisons of gene expressions, metabolic status, organ weights, and serum components

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | The number of mice | | | *p* values | |  | |
|  |  |  | Young | Old | GPC | Old control vs. Young control mice | Old control vs. GPC-fed old mice |  | |
|  | Nerve growth factor | *Ngf* | 6 | 4 | 7 | 0.624 | 0.609 |  | |
|  |  | *Bdnf* | 6 | 4 | 7 | 0.605 | 0.766 |  | |
|  |  | *Ntrk2* | 6 | 4 | 7 | 0.757 | 0.483 |  | |
|  |  | *Ngfr* | 6 | 4 | 7 | 0.167 | 0.889 |  | |
|  |  | *Gdnf* | 6 | 4 | 7 | 0.225 | 0.854 |  | |
|  |  | *Gfra1* | 6 | 4 | 7 | 0.262 | 0.648 |  | |
|  | NADPH oxidase | *p22phox* | 6 | 4 | 7 | 0.163 | 0.582 |  | |
|  |  | *p47phox* | 6 | 4 | 7 | 0.323 | 0.251 |  | |
|  |  | *p67phox* | 6 | 4 | 7 | 0.397 | 0.330 |  | |
|  |  | *qp91phox* | 6 | 4 | 7 | 0.047 | 0.695 |  | |
|  | Nitric oxide synthase | *eNos* | 6 | 4 | 7 | 0.095 | 0.154 |  | |
|  |  | *iNos* | 6 | 4 | 7 | 0.532 | 0.326 |  | |
|  | Inflammatory | *Tnfα* | 6 | 4 | 7 | 0.170 | 0.231 |  | |
|  |  | *Mcp-1* | 6 | 4 | 7 | 0.013 | 0.967 |  | |
|  |  | *Il-6* | 6 | 4 | 7 | 0.692 | 0.638 |  | |
|  | Long term potentiation | *Ampa1* | 6 | 4 | 7 | 0.003 | 0.023 |  | |
|  |  | *Activin bA* | 6 | 4 | 7 | 0.057 | 0.041 |  | |
|  |  | *Vesl-1S* | 6 | 4 | 7 | 0.075 | 0.046 |  | |
|  |  |  |  |  |  |  |  |  | |
|  | Taste related genes | *Tas2r105* | 6 | 4 | 7 | 0.262 | 0.146 |  | |
|  |  | *Tas1r1* | 6 | 4 | 7 | 0.780 | 0.716 |  | |
|  |  | *Tas1r2* | 6 | 4 | 7 | 0.555 | 0.422 |  | |
|  |  | *Tas1r3* | 6 | 4 | 7 | 0.517 | 0.523 |  | |
|  |  | *Pkd2l1* | 6 | 4 | 7 | 0.099 | 0.016 |  | |
|  |  | *Gustducin* | 6 | 4 | 7 | 0.071 | 0.450 |  | |
|  |  | *Plcβ2* | 6 | 4 | 7 | 0.083 | 0.452 |  | |
|  |  |  |  |  |  |  |  |  | |
|  | Energy expenditure | Light | 10 | 4 | 5 | 0.000 | 0.148 |  | |
|  |  | Dark | 10 | 4 | 5 | 0.027 | 0.309 |  | |
|  |  | Whole | 10 | 4 | 5 | 0.005 | 0.171 |  | |
|  | RER | Light | 10 | 4 | 5 | 0.267 | 0.817 |  | |
|  |  | Dark | 10 | 4 | 5 | 0.428 | 0.990 |  | |
|  |  | Whole | 10 | 4 | 5 | 0.345 | 0.922 |  | |
|  |  |  |  |  |  |  |  |  | |
|  | Fatty acid synthesis | *Fasn* | 6 | 4 | 7 | 0.294 | 0.269 |  | |
|  |  | *Acc* | 6 | 4 | 7 | 0.201 | 0.395 |  | |
|  |  | *Srebp1c* | 6 | 4 | 7 | 0.972 | 0.316 |  | |
|  | β oxidation | *Acox1* | 6 | 4 | 7 | 0.163 | 0.613 |  | |
|  |  | *Cpt2* | 6 | 4 | 7 | 0.441 | 0.423 |  | |
|  |  | *Ppara* | 6 | 4 | 7 | 0.032 | 0.038 |  | |
|  | Fatty acid incorporation | *Cd36* | 6 | 4 | 7 | 0.016 | 0.064 |  | |
|  |  | *Ldlr* | 6 | 4 | 7 | 0.206 | 0.859 |  | |
|  |  | *Lrp1* | 6 | 4 | 7 | 0.941 | 0.224 |  | |
|  | Glucose incorporation | *Slc2a2* | 6 | 4 | 7 | 0.269 | 0.366 |  | |
|  | Glucose catabolism | *Gck* | 6 | 4 | 7 | 0.370 | 0.137 |  | |
|  |  | *Foxo1* | 6 | 4 | 7 | 0.379 | 0.719 |  | |
|  |  |  |  |  |  |  |  |  | |
|  | Organ weights | Liver | 10 | 4 | 7 | 0.927 | 0.986 |  | |
|  |  | Kidney | 10 | 4 | 7 | 0.119 | 0.122 |  | |
|  |  | Brown adipose tissue | 10 | 4 | 7 | 0.206 | 0.530 |  | |
|  |  | Mesenteric fat | 10 | 4 | 7 | 0.703 | 0.525 |  | |
|  |  | Perirenal fat | 10 | 4 | 7 | 0.522 | 0.854 |  | |
|  |  | Subcutaneous fat | 9 | 3 | 5 | 0.636 | 0.780 |  | |
|  |  | Soleus muscle | 10 | 4 | 7 | 0.210 | 0.628 |  | |
|  |  | Gastrocnemius muscle | 10 | 4 | 7 | 0.003 | 0.646 |  | |
|  |  |  |  |  |  |  |  |  | |
|  | Serum components | Calcium | 6 | 4 | 7 | 0.064 | 0.480 |  | |
|  |  | Iron | 6 | 4 | 7 | 0.232 | 0.862 |  | |
|  |  | Magnesium | 6 | 4 | 7 | 0.451 | 0.986 |  | |
|  |  | Sodium | 6 | 4 | 7 | 0.350 | 0.856 |  | |
|  |  | Zinc | 6 | 4 | 7 | 0.173 | 0.346 |  | |
|  |  | Angiotensin II | 6 | 4 | 7 | 0.747 | 0.077 |  | |
|  |  |  |  |  |  |  |  |  |

Supplementary Table 5 Weights of various organs (mg/B.W.)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Organs | Young control  (n = 9–10) |  | Old control  (n = 3–4) | GPC-fed old  (n = 4–7) |  |
|  |  |  |  |  |  |  |
|  | Liver | 49.1±2.5 |  | 49.6±4.3 | 49.7±5.8 |  |
|  | Kidney | 6.7±0.2 |  | 7.2±0.2 | 7.8±0.3 |  |
|  | Brown adipose tissue | 3.3±0.3 |  | 2.3±0.6 | 1.9±0.2 |  |
|  | Mesenteric white adipose tissue | 5.9±0.5 |  | 5.1±2.0 | 8.5±4.8 |  |
|  | Perirenal white adipose tissue | 4.1±0.7 |  | 2.7±1.9 | 2.3±0.9 |  |
|  | Subcutaneous fat | 10.0±1.1 |  | 7.9±3.7 | 6.7±1.7 |  |
|  | Soleus muscle | 0.31±0.01 |  | 0.27±0.03 | 0.25±0.01 |  |
|  | Gastrocnemius muscle | 5.3±0.2†† |  | 4.2±0.2 | 4.0±0.1 |  |
|  |  |  |  |  |  |  |

†† *p* < 0.01, Old vs. Young group (Welch’s *t*-test).

Supplementary Table 6 Comparison of serum components

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Serum components | Young control  (n = 6) |  | Old control  (n = 4) | GPC-fed old  (n = 7) |  |
|  |  |  |  |  |  |  |
|  | Calcium (mg/dl) | 11.4 ± 0.6 |  | 13.5 ± 0.8 | 14.5 ± 1.1 |  |
|  | Iron (μg/dl) | 157 ± 13 |  | 185 ± 16 | 180 ± 24 |  |
|  | Magnesium (mg/dl) | 4.8 ± 0.4 |  | 5.5 ± 0.7 | 5.5 ± 0.7 |  |
|  | Sodium (mg/dl) | 262 ± 25 |  | 230 ± 21 | 242 ± 59 |  |
|  | Zinc (μg/dl) | 175 ± 16 |  | 132 ± 22 | 163 ± 22 |  |
|  | Angiotensin II (pg/ml) | 67 ± 22 |  | 79 ± 29 | 154 ± 17 |  |
|  |  |  |  |  |  |  |