**Supplementary File 1**. Intestine gene expression profile of fish fed the control diet (Diet A) and Diet C containing 1.7g OBE per kg feed. Data are expressed the mean ± SE (*n* = 8). β-actin was used as a housekeeping gene and all values were referred to the expression level of NLE1 in fish fed the control as described in Pérez-Sánchez et al. (2015).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Diet A | |  | Diet C | |  | *T-test* |
| Gene | Mean | SE |  | Mean | SE |  | *P-value* |
| *Pcna* | 18.12 | 1.92 |  | 9.84 | 1.93 |  | 0.009 |
| *Bmpr1a* | 1.91 | 0.09 |  | 2.86 | 0.21 |  | 0.003 |
| *Ihh* | 0.11 | 0.03 |  | 0.12 | 0.02 |  | 0.859 |
| *Gli1* | 0.30 | 0.04 |  | 0.31 | 0.03 |  | 0.802 |
| *Hhip* | 3.28 | 0.44 |  | 3.86 | 0.44 |  | 0.371 |
| *Wls* | 0.91 | 0.09 |  | 0.91 | 0.09 |  | 0.969 |
| *Myc* | 0.62 | 0.09 |  | 0.48 | 0.04 |  | 0.169 |
| *Ctnnb1* | 12.73 | 1.25 |  | 16.09 | 1.79 |  | 0.146 |
| *Tcf4* | 0.06 | 0.01 |  | 0.11 | 0.01 |  | 0.005 |
| *Nle1* | 1.02 | 0.07 |  | 0.95 | 0.07 |  | 0.472 |
| *Hes1-b* | 3.72 | 0.74 |  | 3.44 | 0.42 |  | 0.747 |
| *Gfi-1* | 0.14 | 0.02 |  | 0.22 | 0.05 |  | 0.126 |
| *Klf4* | 3.58 | 0.25 |  | 5.56 | 0.54 |  | 0.005 |
| *Itgb1bp1* | 1.55 | 0.11 |  | 1.38 | 0.12 |  | 0.326 |
| *Itgb6* | 9.25 | 0.72 |  | 11.72 | 1.21 |  | 0.101 |
| *Ilk* | 4.92 | 0.67 |  | 5.04 | 0.29 |  | 0.876 |
| *Ocln* | 7.21 | 0.95 |  | 17.80 | 1.86 |  | <0.001 |
| *Cldn3* | 3.06 | 0.32 |  | 4.56 | 0.56 |  | 0.034 |
| *Cldn12* | 1.38 | 0.08 |  | 1.88 | 0.17 |  | 0.028 |
| *Cldn15* | 70.37 | 6.76 |  | 85.89 | 5.99 |  | 0.108 |
| *Tjp1* | 1.04 | 0.13 |  | 1.18 | 0.08 |  | 0.375 |
| *Cdh1* | 26.47 | 2.67 |  | 33.69 | 2.48 |  | 0.068 |
| *Cdh17* | 109.46 | 4.45 |  | 128.39 | 11.66 |  | 0.164 |
| *F11r* | 15.31 | 1.08 |  | 19.51 | 1.17 |  | 0.02 |
| *Cxadr* | 15.24 | 1.52 |  | 20.98 | 1.67 |  | 0.023 |
| *Dsp* | 5.23 | 0.59 |  | 9.76 | 0.97 |  | 0.001 |
| *Cx32.2* | 150.69 | 23.66 |  | 195.02 | 27.80 |  | 0.245 |
| *Gjb4* | 0.36 | 0.03 |  | 0.37 | 0.04 |  | 0.802 |
| *Muc2* | 212.07 | 25.29 |  | 210.46 | 32.99 |  | 0.97 |
| *Muc2-like* | 28.31 | 2.95 |  | 33.60 | 2.51 |  | 0.193 |
| *Muc13* | 146.59 | 19.27 |  | 184.64 | 20.49 |  | 0.198 |
| *I-muc* | 0.70 | 0.13 |  | 0.74 | 0.11 |  | 0.819 |
| *Alpi* | 83.16 | 10.70 |  | 139.52 | 16.86 |  | 0.014 |
| *Fabp1* | 468.25 | 25.18 |  | 587.76 | 38.72 |  | 0.022 |
| *Fabp2* | 2766.01 | 253.26 |  | 3362.56 | 330.30 |  | 0.174 |
| *Fabp6* | 20637.37 | 4004.85 |  | 16360.74 | 3903.42 |  | 0.457 |
| *Calr* | 23.67 | 2.81 |  | 15.25 | 1.98 |  | 0.033 |
| *Canx* | 11.91 | 1.35 |  | 13.05 | 1.66 |  | 0.6 |
| *Gr* | 3.53 | 0.34 |  | 4.88 | 0.48 |  | 0.038 |
| *Gst3* | 124.24 | 6.29 |  | 127.79 | 13.21 |  | 0.812 |
| *Sod1* | 60.23 | 5.12 |  | 58.84 | 6.83 |  | 0.872 |
| *Prdx1* | 130.08 | 6.36 |  | 119.29 | 28.39 |  | 0.721 |
| *Prdx2* | 217.92 | 12.88 |  | 237.93 | 16.95 |  | 0.363 |
| *Il1β* | 0.18 | 0.03 |  | 0.22 | 0.03 |  | 0.305 |
| *Il1r1* | 1.75 | 0.19 |  | 3.81 | 0.58 |  | 0.009 |
| *Il6* | 0.11 | 0.02 |  | 0.13 | 0.02 |  | 0.371 |
| *Il6rb* | 2.20 | 0.24 |  | 3.06 | 0.31 |  | 0.048 |
| *Il7* | 1.05 | 0.07 |  | 0.85 | 0.06 |  | 0.05 |
| *Il8* | 0.44 | 0.08 |  | 0.79 | 0.11 |  | 0.02 |
| *Il8ra* | 0.18 | 0.03 |  | 0.24 | 0.04 |  | 0.278 |
| *Il10* | 0.43 | 0.05 |  | 0.45 | 0.06 |  | 0.815 |
| *Il10ra* | 1.35 | 0.16 |  | 2.00 | 0.21 |  | 0.024 |
| *Il12b* | 1.06 | 0.09 |  | 1.82 | 0.21 |  | 0.009 |
| *Tnfα* | 0.35 | 0.04 |  | 0.55 | 0.07 |  | 0.019 |
| *Csf1r1* | 0.67 | 0.08 |  | 0.95 | 0.07 |  | 0.016 |
| *Cxcl9* | 18.44 | 2.22 |  | 24.02 | 1.72 |  | 0.067 |
| *Ccl21* | 123.63 | 10.69 |  | 115.56 | 10.05 |  | 0.591 |
| *Ccr3* | 1.55 | 0.18 |  | 1.59 | 0.15 |  | 0.858 |
| *Ccr9* | 4.46 | 0.56 |  | 6.99 | 0.55 |  | 0.006 |
| *Ccr11* | 3.22 | 0.55 |  | 12.13 | 2.09 |  | 0.003 |
| *Ccl20* | 12.87 | 1.52 |  | 13.91 | 1.33 |  | 0.615 |
| *Cd48* | 5.49 | 0.50 |  | 5.20 | 0.39 |  | 0.654 |
| *Cd276* | 1.01 | 0.11 |  | 1.09 | 0.12 |  | 0.617 |
| *Tlr1* | 0.68 | 0.04 |  | 0.82 | 0.07 |  | 0.123 |
| *Tlr2* | 0.89 | 0.05 |  | 1.19 | 0.08 |  | 0.01 |
| *Tlr5* | 0.11 | 0.03 |  | 0.12 | 0.02 |  | 0.662 |
| *Tlr9* | 0.19 | 0.03 |  | 0.18 | 0.02 |  | 0.848 |
| *Nod1* | 0.72 | 0.07 |  | 1.17 | 0.08 |  | 0.001 |
| *Mrc1* | 0.93 | 0.16 |  | 1.16 | 0.12 |  | 0.265 |
| *Cd209* | 0.40 | 0.04 |  | 0.46 | 0.04 |  | 0.352 |
| *Cd302* | 5.93 | 0.37 |  | 9.07 | 0.87 |  | 0.008 |
| *Clec10a* | 0.18 | 0.02 |  | 0.17 | 0.04 |  | 0.91 |
| *Lgals1* | 22.20 | 2.83 |  | 21.87 | 2.44 |  | 0.93 |
| *Lgals8* | 5.14 | 0.76 |  | 4.82 | 0.50 |  | 0.732 |
| *Csl2* | 9.45 | 5.13 |  | 15.62 | 5.08 |  | 0.407 |
| *Fcl* | 29.66 | 14.64 |  | 92.99 | 15.50 |  | 0.011 |
| *Vim* | 1.00 | 0.09 |  | 1.05 | 0.16 |  | 0.789 |
| *mtHsp10* | 14.23 | 1.43 |  | 6.91 | 0.73 |  | 0.001 |
| *mtHsp60* | 4.06 | 0.52 |  | 1.96 | 0.16 |  | 0.005 |
| *mtHSP70* | 10.01 | 0.80 |  | 8.55 | 0.47 |  | 0.136 |
| *Ech* | 51.18 | 2.03 |  | 55.19 | 11.63 |  | 0.744 |
| *Hadh* | 40.91 | 3.47 |  | 50.23 | 5.94 |  | 0.197 |
| *Cs* | 29.05 | 2.25 |  | 32.01 | 2.66 |  | 0.412 |
| *Tim44* | 0.67 | 0.06 |  | 0.48 | 0.03 |  | 0.017 |
| *Tom22* | 3.67 | 0.24 |  | 2.87 | 0.23 |  | 0.031 |
| *mtTfa* | 2.18 | 0.09 |  | 2.36 | 0.15 |  | 0.339 |
| *Nrf1* | 1.09 | 0.08 |  | 1.16 | 0.09 |  | 0.52 |
| *Pgc1a* | 1.17 | 0.14 |  | 2.04 | 0.22 |  | 0.007 |