

**Supplementary Information for:** Constant light in critical postnatal days affects circadian rhythms in locomotion and gene expression in the suprachiasmatic nucleus, retina, and pineal gland later in life

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Table 1: One-way ANOVA statistics. One-way ANOVA was used to test the significance in variation in mRNA levels among nine daily time points.

| SCN           | P30      |          |       |          | P90      |          |       |          |
|---------------|----------|----------|-------|----------|----------|----------|-------|----------|
|               | controls |          | LL    |          | controls |          | LL    |          |
|               | F =      | p value  | F =   | p value  | F =      | p value  | F =   | p value  |
| <i>Per1</i>   | 5,848    | <0.0001  | 2,385 | = 0.0277 | –        | –        | –     | –        |
| <i>Per2</i>   | 7,772    | <0.0001  | 3,924 | = 0.0009 | 17.790   | <0.0001  | 5.758 | = 0.0020 |
| <i>Nr1d1</i>  | 4.033    | = 0.0010 | 0.579 | = 0.7909 | 3.920    | = 0.0123 | 5.199 | = 0.0031 |
| <i>Bdnf</i>   | 0.172    | = 0.9937 | 1.960 | = 0.0705 | 1.685    | = 0.1826 | 9.872 | <0.0001  |
| <i>Stat3</i>  | 3.028    | = 0.0078 | 0.443 | = 0.8898 | 5.784    | = 0.0019 | 2.985 | = 0.0374 |
| <i>Grin1</i>  | 2.631    | = 0.0173 | 0.708 | = 0.6832 | 6.754    | = 0.0007 | 1.531 | = 0.2224 |
| <i>Grin2b</i> | 3.669    | = 0.0019 | 0.859 | = 0.5566 | 8.803    | = 0.0001 | 0.489 | = 0.7433 |

| Retina       | P30      |          |       |          | P90      |          |        |          |
|--------------|----------|----------|-------|----------|----------|----------|--------|----------|
|              | controls |          | LL    |          | controls |          | LL     |          |
|              | F =      | p value  | F =   | p value  | F =      | p value  | F =    | p value  |
| <i>Per1</i>  | 1.611    | = 0.1419 | 0.667 | = 0.7180 | 9.015    | <0.0001  | 2.490  | = 0.0643 |
| <i>Per2</i>  | 1.708    | = 0.1168 | 3.179 | = 0.0056 | 10.370   | <0.0001  | 6.929  | = 0.0005 |
| <i>Nr1d1</i> | 2.184    | = 0.0431 | 0.790 | = 0.6137 | 8.740    | <0.0001  | 3.940  | = 0.0113 |
| <i>Bdnf</i>  | 0.979    | = 0.4625 | 3.432 | = 0.0031 | 0.715    | = 0.5884 | 3.855  | = 0.0128 |
| <i>Stat3</i> | 0.828    | = 0.5809 | 0.724 | = 0.6694 | –        | –        | –      | –        |
| <i>Aanat</i> | 21.180   | <0.0001  | 7.806 | <0.0001  | 15.720   | <0.0001  | 18.310 | <0.0001  |
| <i>OPN4</i>  | 4.842    | = 0.0001 | 2.020 | = 0.0602 | 12.500   | <0.0001  | 17.280 | <0.0001  |

|               |       |          |       |          |       |          |       |          |
|---------------|-------|----------|-------|----------|-------|----------|-------|----------|
| <i>OPN5</i>   | 1.559 | = 0.1570 | 1.723 | = 0.1119 | 1.473 | = 0.2369 | 1.792 | = 0.1574 |
| <i>OPN1SW</i> | 1.039 | = 0.4175 | 0.385 | = 0.9243 | 5.448 | = 0.0021 | 0.764 | = 0.5577 |
| <i>Rho</i>    | 5.851 | <0.0001  | 0.564 | = 0.8024 | 6.299 | = 0.0008 | 5.539 | = 0.8024 |

| Pineal gland | P30      |         |        |         | P90      |          |        |          |
|--------------|----------|---------|--------|---------|----------|----------|--------|----------|
|              | controls |         | LL     |         | controls |          | LL     |          |
|              | F =      | p value | F =    | p value | F =      | p value  | F =    | p value  |
| <i>Per1</i>  | 28.880   | <0.0001 | 8.804  | <0.0001 | 17.37    | <0.0001  | 10.910 | <0.0001  |
| <i>Per2</i>  | 13.810   | <0.0001 | 7.373  | <0.0001 | 8.357    | = 0.0002 | 12.100 | <0.0001  |
| <i>Nr1d1</i> | 49.080   | <0.0001 | 9.902  | <0.0001 | 3.523    | = 0.0287 | 2.470  | = 0.0667 |
| <i>Bdnf</i>  | 7.598    | <0.0001 | 8.899  | <0.0001 | –        | –        | –      | –        |
| <i>Stat3</i> | 44.800   | <0.0001 | 19.340 | <0.0001 | 4.055    | = 0.0115 | 1.841  | = 0.1490 |
| <i>Tph1</i>  | 21.620   | <0.0001 | 6.048  | <0.0001 | 6.756    | = 0.0007 | 4.112  | = 0.0093 |
| <i>Aanat</i> | 38.410   | <0.0001 | 22.670 | <0.0001 | 101.8    | <0.0001  | 22.450 | <0.0001  |
| <i>Icer</i>  | 64.390   | <0.0001 | 27.690 | <0.0001 | 31.29    | <0.0001  | 32.950 | <0.0001  |

Table 2: Cosinor analysis. Cosinor analysis was used to confirm a significant circadian rhythmicity for all gene expression profiles

| SCN           | P30      |          | P90      |          |
|---------------|----------|----------|----------|----------|
|               | controls | LL       | controls | LL       |
|               | p value  |          | p value  |          |
| <i>Per1</i>   | <0.0001  | = 0.0677 | –        | –        |
| <i>Per2</i>   | <0.0001  | <0.0001  | <0.0001  | = 0.0002 |
| <i>Nr1d1</i>  | <0.0001  | = 0.3237 | = 0.0013 | = 0.0003 |
| <i>Bdnf</i>   | = 0.8617 | = 0.0071 | = 0.0798 | <0.0001  |
| <i>Stat3</i>  | = 0.0001 | = 0.4333 | = 0.0070 | = 0.0052 |
| <i>Grin1</i>  | = 0.0007 | = 0.1378 | <0.0001  | = 0.3934 |
| <i>Grin2b</i> | = 0.0002 | = 0.1417 | = 0.0007 | = 0.3660 |

| Retina       | P30      |          | P90      |          |
|--------------|----------|----------|----------|----------|
|              | controls | LL       | controls | LL       |
|              | p value  |          | p value  |          |
| <i>Per1</i>  | = 0.0069 | = 0.5174 | <0.0001  | = 0.0186 |
| <i>Per2</i>  | = 0.0176 | = 0.0176 | <0.0001  | <0.0001  |
| <i>Nr1d1</i> | = 0.0108 | = 0.4059 | <0.0001  | = 0.0025 |
| <i>Bdnf</i>  | = 0.0449 | = 0.0007 | = 0.6496 | = 0.0053 |
| <i>Stat3</i> | = 0.8226 | = 0.1870 | –        | –        |
| <i>Aanat</i> | <0.0001  | <0.0001  | <0.0001  | <0.0001  |
| <i>Opn4</i>  | <0.0001  | = 0.0514 | <0.0001  | <0.0001  |

|               |          |          |          |          |
|---------------|----------|----------|----------|----------|
| <i>Opn5</i>   | = 0.2166 | = 0.0357 | = 0.2434 | = 0.0339 |
| <i>Opn1sw</i> | = 0.1336 | = 0.4042 | = 0.0013 | = 0.2380 |
| <i>Rho</i>    | < 0,0001 | = 0.5627 | = 0.0293 | = 0.0029 |

| Pineal gland | P30            |         | P90            |          |
|--------------|----------------|---------|----------------|----------|
|              | controls       | LL      | controls       | LL       |
|              | <i>p</i> value |         | <i>p</i> value |          |
| <i>Per1</i>  | <0.0001        | <0.0001 | <0.0001        | <0.0001  |
| <i>Per2</i>  | <0.0001        | <0.0001 | <0.0001        | <0.0001  |
| <i>Nr1d1</i> | <0.0001        | <0.0001 | = 0.0001       | = 0.0581 |
| <i>Bdnf</i>  | <0.0001        | <0.0001 | –              | –        |
| <i>Stat3</i> | <0.0001        | <0.0001 | = 0.0023       | = 0.0702 |
| <i>Tph1</i>  | <0.0001        | <0.0001 | = 0.0002       | = 0.0010 |
| <i>Aanat</i> | <0.0001        | <0.0001 | <0.0001        | <0.0001  |
| <i>Icer</i>  | <0.0001        | <0.0001 | <0.0001        | <0.0001  |

Table 3: Two-way ANOVA statistics. Two-way ANOVA was used to analyse the difference between control and LL-reared animals in the SCN, retina and pineal gland.

| SCN           |             | P30    |                | P90    |                |
|---------------|-------------|--------|----------------|--------|----------------|
|               |             | F=     | <i>p</i> value | F=     | <i>p</i> value |
| <i>Per1</i>   | interaction | 3.179  | = 0.0028       | –      | –              |
|               | time        | 6.583  | <0.0001        | –      | –              |
|               | group       | 8.565  | = 0.0042       | –      | –              |
| <i>Per2</i>   | interaction | 2.367  | = 0.0218       | 0.590  | = 0.6716       |
|               | time        | 10.590 | <0.0001        | 17.380 | <0.0001        |
|               | group       | 10.400 | = 0.0017       | 0.158  | = 0.6929       |
| <i>Nr1d1</i>  | interaction | 1.634  | = 0.1240       | 0.305  | = 0.8734       |
|               | time        | 2.857  | = 0.0065       | 8.443  | <0.0001        |
|               | group       | 8.459  | = 0.0044       | 0.757  | = 0.3880       |
| <i>Bdnf</i>   | interaction | 1.007  | = 0.4355       | 2.304  | = 0.0698       |
|               | time        | 1.025  | = 0.4221       | 6.855  | = 0.0001       |
|               | group       | 0.062  | = 0.8032       | 0.638  | = 0.4280       |
| <i>Stat3</i>  | interaction | 1.834  | = 0.0791       | 2.367  | = 0.0650       |
|               | time        | 2.929  | = 0.0055       | 4.814  | = 0.0023       |
|               | group       | 8.080  | = 0.0054       | 1.771  | = 0.1891       |
| <i>Grin1</i>  | interaction | 1.521  | = 0.1586       | 1.654  | = 0.1744       |
|               | time        | 0.968  | = 0.4648       | 6.089  | = 0.0004       |
|               | group       | 0.640  | = 0.4255       | 0.342  | = 0.5610       |
| <i>Grin2b</i> | interaction | 3.119  | = 0.0034       | 1.793  | = 0.1433       |
|               | time        | 1.463  | = 0.1798       | 3.292  | = 0.0185       |

|  |       |                |                |
|--|-------|----------------|----------------|
|  | group | 7.113 = 0.0089 | 4.215 = 0.0448 |
|--|-------|----------------|----------------|

| Retina        |             | P30    |          | P90    |          |
|---------------|-------------|--------|----------|--------|----------|
|               |             | F=     | p value  | F=     | p value  |
| <i>Per1</i>   | interaction | 0.553  | = 0.9137 | 0.567  | = 0.6874 |
|               | time        | 1.661  | = 0.1160 | 9.565  | <0.0001  |
|               | group       | 1.702  | = 0.1947 | 0.767  | = 0.3847 |
| <i>Per2</i>   | interaction | 1.272  | = 0.2663 | 2.281  | = 0.0719 |
|               | time        | 3.590  | = 0.0010 | 14.110 | <0.0001  |
|               | group       | 0.002  | = 0.9679 | 1.003  | = 0.3209 |
| <i>Nr1d1</i>  | interaction | 1.582  | = 0.1385 | 1.388  | = 0.2492 |
|               | time        | 1.369  | = 0.2183 | 10.590 | <0.0001  |
|               | group       | 0.004  | = 0.9524 | 1.353  | = 0.2494 |
| <i>Bdnf</i>   | interaction | 1.811  | = 0.0831 | 1.038  | = 0.3955 |
|               | time        | 3.295  | = 0.0021 | 3.426  | = 0.0139 |
|               | group       | 2.593  | = 0.1103 | 1.157  | = 0.2866 |
| <i>Stat3</i>  | interaction | 0.654  | = 0.7304 | –      | –        |
|               | time        | 0.854  | = 0.5572 | –      | –        |
|               | group       | 0.049  | = 0.8254 | –      | –        |
| <i>Aanat</i>  | interaction | 6.902  | <0.0001  | 0.796  | = 0.5328 |
|               | time        | 25.720 | <0.0001  | 33.300 | <0.0001  |
|               | group       | 4.614  | = 0.0339 | 2.674  | = 0.1076 |
| <i>Opn4</i>   | interaction | 2.259  | = 0.0278 | 1.883  | = 0.1254 |
|               | time        | 4.971  | <0.0001  | 26.900 | <0.0001  |
|               | group       | 10.780 | = 0.0014 | 6.866  | = 0.0112 |
| <i>Opn5</i>   | interaction | 1.326  | = 0.2375 | 2.484  | = 0.0537 |
|               | time        | 1.982  | = 0.0545 | 0.606  | = 0.6599 |
|               | group       | 6.557  | = 0.0117 | 4.866  | = 0.0314 |
| <i>Opn1sw</i> | interaction | 0.283  | = 0.9705 | 1.328  | = 0.2706 |
|               | time        | 1.052  | = 0.4016 | 2.003  | = 0.1064 |
|               | group       | 0.260  | = 0.6112 | 0.085  | = 0.7716 |
| <i>Rho</i>    | interaction | 3.132  | = 0.0030 | 1.340  | = 0.2658 |
|               | time        | 2.273  | = 0.0268 | 10.360 | <0.0001  |
|               | group       | 4.499  | = 0.0360 | 6.642  | = 0.0125 |

| Pineal gland |             | P30    |          | P90    |          |
|--------------|-------------|--------|----------|--------|----------|
|              |             | F=     | p value  | F=     | p value  |
| <i>Per1</i>  | interaction | 2,462  | = 0.0166 | 2.612  | = 0.3175 |
|              | time        | 33.550 | <0.0001  | 29.020 | = 0.0018 |
|              | group       | 15.350 | = 0.0001 | 5.770  | = 0.0198 |
| <i>Per2</i>  | interaction | 1.583  | = 0.1369 | 1.269  | = 0.2932 |
|              | time        | 19.130 | <0.0001  | 18.320 | <0.0001  |
|              | group       | 5.816  | = 0.0174 | 1.877  | = 0.1761 |
| <i>Nr1d1</i> | interaction | 9.972  | <0.0001  | 1.221  | = 0.3124 |
|              | time        | 47.700 | <0.0001  | 5.356  | = 0.0010 |
|              | group       | 11.340 | = 0.0010 | 1.379  | = 0.2458 |

|              |             |        |          |        |          |
|--------------|-------------|--------|----------|--------|----------|
| <i>Bdnf</i>  | interaction | 7.260  | <0.0001  | –      | –        |
|              | time        | 8.976  | <0.0001  | –      | –        |
|              | group       | 8.092  | = 0.0052 | –      | –        |
| <i>Stat3</i> | interaction | 3.432  | = 0.0014 | 1.209  | = 0.3175 |
|              | time        | 59.580 | <0.0001  | 4.934  | = 0.0018 |
|              | group       | 11.340 | = 0.0003 | 5.770  | = 0.0198 |
| <i>Tph1</i>  | interaction | 1.709  | = 0.1031 | 1.887  | = 0.1266 |
|              | time        | 23.420 | <0.0001  | 9.839  | <0.0001  |
|              | group       | 11.960 | = 0.0008 | 4.829  | = 0.0321 |
| <i>Aanat</i> | interaction | 4.504  | <0.0001  | 13.240 | <0.0001  |
|              | time        | 58.230 | <0.0001  | 98.480 | <0.0001  |
|              | group       | 20.820 | <0.0001  | 10.910 | = 0.0017 |
| <i>Icer</i>  | interaction | 2.163  | 0.0349   | 0.268  | = 0.8971 |
|              | time        | 79.910 | <0.0001  | 62.970 | <0.0001  |
|              | group       | 0.280  | 0.5976   | 0.176  | = 0.6767 |