**Supplementary Material for: Disrupted circadian control of hormonal rhythms and anticipatory thirst by dim light at night**

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**Supplementary Table 1:** Cosinor analysis of daily rhythms in the clock and clock-controlled genes in the hypothalamic nuclei.

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| --- | --- | --- | --- | --- | --- | --- |
|  | **Mesor** | **Amplitude** | **Acrophase**  hh:mm | **R2** | ***F*-test** | ***p*-value** |
| ***Per1* in SCN** |  |  |  |  |  |  |
| CTRL | 0.519 ± 0.062 | 0.469 ± 0.085 | 5:46 ± 0:44 | 0.84 | *F*(2,23) = 58.83 | **0.000** |
| ALAN | 0.449 ± 0.042 | 0.136 ± 0.061\*\*\* | 6:28 ± 1:36 | 0.48 | *F*(2,21) = 9.50 | **0.001** |
| ***Per2* in SCN** |  |  |  |  |  |  |
| CTRL | 0.457 ± 0.046 | 0.444 ± 0.067 | 10:19 ± 0:33 | 0.88 | *F*(2,24) = 84.22 | **0.000** |
| ALAN | - | - | - | 0.16 | *F*(2,23) = 2.21 | 0.132 |
| ***Nr1d1* in SCN** |  |  |  |  |  |  |
| CTRL | 0.528 ± 0.064 | 0.361 ± 0.088 | 4:20 ± 0:59 | 0.76 | *F*(2,21) = 32.59 | **0.000** |
| ALAN | 0.524 ± 0.046 | 0.122 ± 0.066\*\*\* | 2:02 ± 2:01# | 0.37 | *F*(2,22) = 6.60 | **0.006** |
| ***Avp* in SCN** |  |  |  |  |  |  |
| CTRL | 0.494 ± 0.048 | 0.359 ± 0.069 | 10:31 ± 0:42 | 0.84 | *F*(2,20) = 51.84 | **0.000** |
| ALAN | 0.376 ± 0.043\* | 0.104 ± 0.063\*\*\* | 8:56 ± 2:13 | 0.33 | *F*(2,21) = 5.23 | **0.014** |
| ***Avp* in SON** |  |  |  |  |  |  |
| CTRL | 0.388 ± 0.105 | 0.192 ± 0.148 | 6:47 ± 2:55 | 0.24 | *F*(2,21) = 3.23 | **0.060** |
| ALAN | 0.353 ± 0.073 | 0.142 ± 0.105 | 8:18 ± 2:43 | 0.24 | *F*(2,22) = 3.50 | **0.048** |
| ***Avp* in PVN** |  |  |  |  |  |  |
| CTRL | - | - | - | 0.16 | *F*(2,22) = 2.13 | 0.143 |
| ALAN | - | - | - | 0.04 | *F*(2,21) = 0.49 | 0.620 |
| ***Per1* in PVN** |  |  |  |  |  |  |
| CTRL | 0.334 ± 0.052 | 0.293 ± 0.075 | 14:03 ± 0:57 | 0.70 | *F*(2,25) = 29.46 | **0.000** |
| ALAN | 0.261 ± 0.039 | 0.166 ± 0.054\*\* | 13:43 ± 1:17 | 0.62 | *F*(2,22) = 17.97 | **0.000** |
| ***Per1* in cDMH** |  |  |  |  |  |  |
| CTRL | 0.448 ± 0.070 | 0.270 ± 0.094 | 17:51 ± 1:28 | 0.59 | *F*(2,22) = 15.78 | **0.000** |
| ALAN | 0.371 ± 0.081 | 0.230 ± 0.113 | 14:33 ± 1:56\*\* | 0.44 | *F*(2,20) = 7.89 | **0.003** |

CTRL, rats exposed to the control light/dark regime; ALAN, rats exposed to low-intensity light (~2 lx) at night for 2 weeks; Avp, arginine vasopressin; cDMH, the compact dorsomedial hypothalamic nucleus; PVN, the paraventricular nucleus; SCN, the suprachiasmatic nucleus; SON, the supraoptic nucleus. Estimates of mesor (the time series mean), amplitude (one half the peak-to-trough difference) and acrophase (the peak time of the fitted curve) ± 95% confidence limits. R2, F and p-values describe significance of 24-h rhythms. Differences in amplitude and acrophase between the CTRL and ALAN groups were evaluated with Wald tests, \*\*\**p* < 0.001, \*\**p* < 0.01, \**p* < 0.05 and #*p* < 0.1.

**Supplementary Table 2:** Cosinor analysis of daily hormone rhythms.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Mesor** | **Amplitude** | **Acrophase**  hh:mm | **R2** | ***F*-test** | ***P*-value** |
| **Pineal melatonin (ng/gland)** |  |  |  |  |  |  |
| CTRL | 1.27 ± 0.26 | 1.72 ± 0.37 | 20:27 ± 0:49 | 0.71 | *F*(2,33) = 40.93 | **0.000** |
| ALAN | 0.64 ± 0.16 | 0.45 ± 0.23\*\*\* | 19:08 ± 1:57 | 0.33 | *F*(2,33) = 7.74 | **0.002** |
| **Plasma melatonin (pg/mL)** |  |  |  |  |  |  |
| CTRL | 66.98 ± 16.54 | 68.91 ± 23.40 | 21:15 ± 1:17 | 0.50 | *F*(2,33) = 16.66 | **0.000** |
| ALAN | - | - | - | 0.08 | *F*(2,32) = 1.37 | 0.267 |
| **Plasma corticosterone (ng/mL)** |  |  |  |  |  |  |
| CTRL | 149.63 ± 24.97 | 145.33 ± 35.31 | 13:46 ± 0:55 | 0.66 | *F*(2,33) = 32.53 | **0.000** |
| ALAN | 108.71 ± 22.2 | 79.85 ± 31.40\*\* | 11:44 ± 1:30\* | 0.43 | *F*(2,33) = 12.42 | **0.000** |
| **Plasma testosterone (ng/mL)** |  |  |  |  |  |  |
| CTRL | 2.51 ± 0.52 | 0.97 ± 0.73 | 17:13 ± 2:55 | 0.18 | *F*(2,32 ) = 3.42 | **0.045** |
| ALAN | - | - | - | 0.12 | *F*(2,32) = 2.11 | 0.138 |
| **Plasma AVP (pg/mL)** |  |  |  |  |  |  |
| CTRL | 11.38 ± 4.73 | 8.75 ± 6.71 | 20:10 ± 2:57 | 0.22 | *F*(2,24 ) = 3.32 | **0.053** |
| ALAN | - | - | - | 0.08 | *F*(2,26) = 1.19 | 0.320 |
| **Plasma TSH (ng/mL)** |  |  |  |  |  |  |
| CTRL | 2.00 ± 0.34 | 0.73 ± 0.49 | 7:10 ± 2:27 | 0.21 | *F*(2,31) = 4.20 | **0.024** |
| ALAN | 2.10 ± 0.40 | 0.73 ± 0.56 | 7:08 ± 2:55 | 0.16 | *F*(2,33) = 3.26 | **0.051** |
| **Plasma T3 (ng/mL)** |  |  |  |  |  |  |
| CTRL | - | - | - | 0.02 | *F*(2,33) = 0.38 | 0.685 |
| ALAN | 1.77 ± 0.07 | 0.13 ± 0.10 | 4:16 ± 2:57 | 0.16 | *F*(2,33) = 3.21 | **0.053** |
| **Plasma T4 (ng/mL)** |  |  |  |  |  |  |
| CTRL | - | - | - | 0.07 | *F*(2,33) = 1.31 | 0.283 |
| ALAN | - | - | - | 0.03 | *F*(2,33) = 0.50 | 0.611 |
| **Plasma T3/T4 ratio** |  |  |  |  |  |  |
| CTRL | - | - | - | 0.04 | *F*(2,33) = 0.61 | 0.550 |
| ALAN | - | - | - | 0.04 | *F*(2,33) = 0.70 | 0.505 |

CTRL, rats exposed to the control light/dark regime; ALAN, rats exposed to low-intensity light (~2 lx) at night for 2 weeks; AVP, arginine vasopressin; TSH, thyroid-stimulating hormone; T3, triiodothyronine; T4, thyroxine. Estimates of mesor (the time series mean), amplitude (one half the peak-to-trough difference) and acrophase (the peak time of the fitted curve) ± 95% confidence limits. R2, *F* and *p*-values describe significance of 24-h rhythms. Differences in amplitude and acrophase between the CTRL and ALAN groups were evaluated with Wald tests, \*\*\**p* < 0.001, \*\**p* < 0.01 and \**p* < 0.05.

**Supplementary Table 3:** Cosinor analysis of *Per2* mRNA peripheral rhythms.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Mesor** | **Amplitude** | **Acrophase**  hh:mm | **R2** | ***F*-test** | ***P*-value** |
| ***Per2* in the liver** |  |  |  |  |  |  |
| CTRL | 0.443 ± 0.031 | 0.421 ± 0.044 | 16:44 ± 0:23 | 0.92 | *F*(2,33) = 179.29 | **0.000** |
| ALAN | 0.467 ± 0.037 | 0.384 ± 0.053 | 15:58 ± 0:31\* | 0.86 | *F*(2,33) = 101.50 | **0.000** |
| ***Per2* in the adipose tissue** |  |  |  |  |  |  |
| CTRL | 0.303 ± 0.054 | 0.310 ± 0.077 | 15:30 ± 0:56 | 0.66 | *F*(2,32) = 31.46 | **0.000** |
| ALAN | 0.279 ± 0.042 | 0.174 ± 0.059\*\* | 14:48 ± 1:17 | 0.50 | *F*(2,33) = 16.80 | **0.000** |
| ***Per2* in the spleen** |  |  |  |  |  |  |
| CTRL | 0.352 ± 0.030 | 0.376 ± 0.042 | 13:53 ± 0:25 | 0.90 | *F*(2,33) = 152.61 | **0.000** |
| ALAN | 0.333 ± 0.036 | 0.269 ± 0.051\*\* | 13:23 ± 0:43 | 0.76 | *F*(2,33) = 53.10 | **0.000** |

CTRL, rats exposed to the control light/dark regime; ALAN, rats exposed to low-intensity light (~2 lx) at night for 2 weeks. Estimates of mesor (the time series mean), amplitude (one half the peak-to-trough difference) and acrophase (the peak time of the fitted curve) ± 95% confidence limits. R2, *F* and *p*-values describe significance of 24-h rhythms. Differences in amplitude and acrophase between the CTRL and ALAN groups were evaluated with Wald tests, \*\**p* < 0.01 and \**p* < 0.05.