Supplementary Information

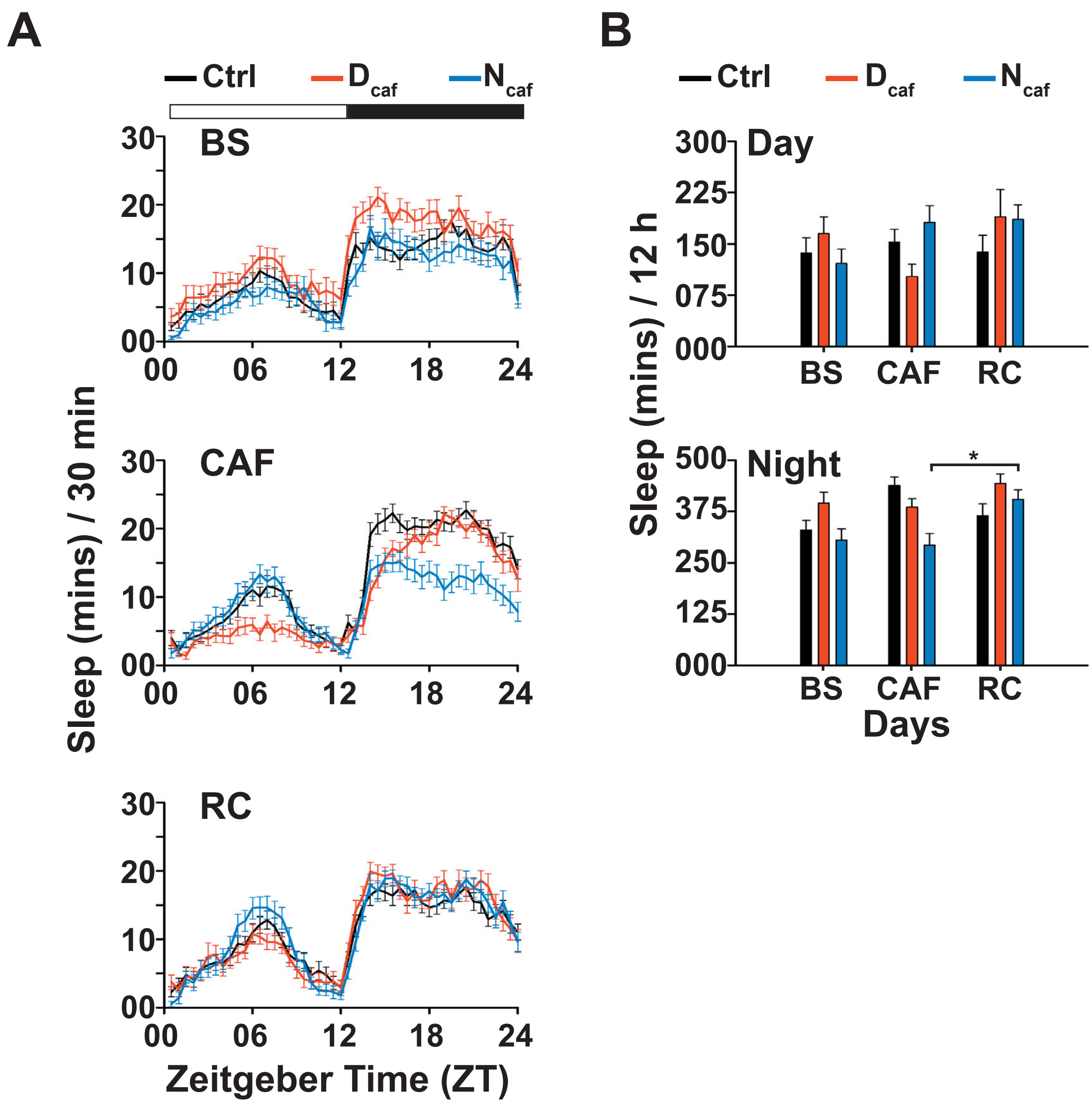

Fig. S1. (A) Sleep in minutes for every half hour over a period of 24 h is shown for w^{1118} flies fed with standard food (Ctrl, *n* = 28), flies fed with 1.0 mg/ml caffeine only during the day (D_{caf}, *n* = 29) and only during the night (N_{caf}, *n* = 28) averaged across two baseline (BS), three caffeine feeding (CAF) and two recovery (RC) days. (B) Daytime (top) and night (bottom) sleep of control, D_{caf} and N_{caf} flies are compared across BS, CAF and RC days. Only night sleep of N_{caf} flies during CAF and RC days is significantly different from each other (two-way ANOVA with treatment and days as fixed factors followed by post-hoc Tukey's HSD test). All other details as in Figure 1.

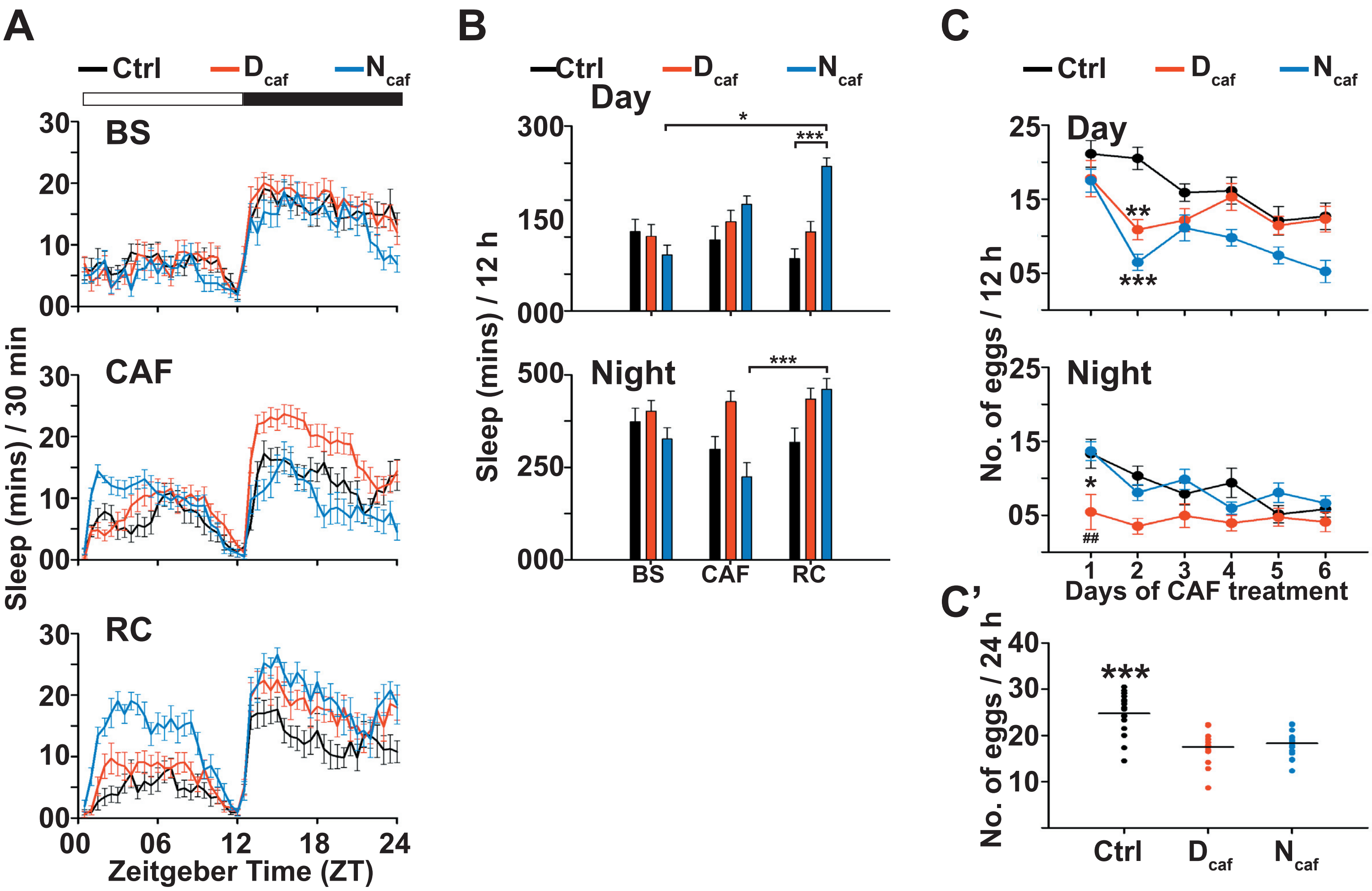

Fig. S2. (A) Sleep in minutes for every half hour over a period of 24 h is shown for control flies of outbred *CCM* population fed with standard food (Ctrl, n = 16), flies fed with caffeine only during the day (D_{caf}, n = 16) and only during the night (N_{caf}, n = 14) for caffeine concentration of 4.0 mg/ml averaged across two baseline (BS), three caffeine feeding (CAF) and two recovery (RC) days. Night sleep of N_{caf} flies during CAF days is lower than that of controls, and both daytime and night sleep of N_{caf} flies is higher than the controls during RC. (B) Daytime sleep levels of control and D_{caf} flies show no differences across different days, whereas those of control and N_{caf} flies significantly differ from each other during RC. Daytime sleep of N_{caf} flies during RC is significantly higher than that during BS. Night sleep of N_{caf} flies during CAF and RC days are significantly different from each other other (two-way ANOVA with treatment and days as fixed factors followed by post-hoc Tukey's HSD test). (C) N_{caf} flies showed a trend of laying lower number of eggs than controls during the daytime (top), which was significant on day 2, while D_{caf} flies showed a trend of laying lower number of eggs during the night (bottom) which was significant on night 1 (Kruskal-Wallis test). (C') Total eggs laid by control (n = 16), D_{caf} (n = 14) and N_{caf} (n = 18) flies averaged across six days of caffeine feeding. Control flies laid higher number of eggs as compared to both D_{caf} and N_{caf} flies (Kruskal-Wallis test). All other details as in Figure 1.

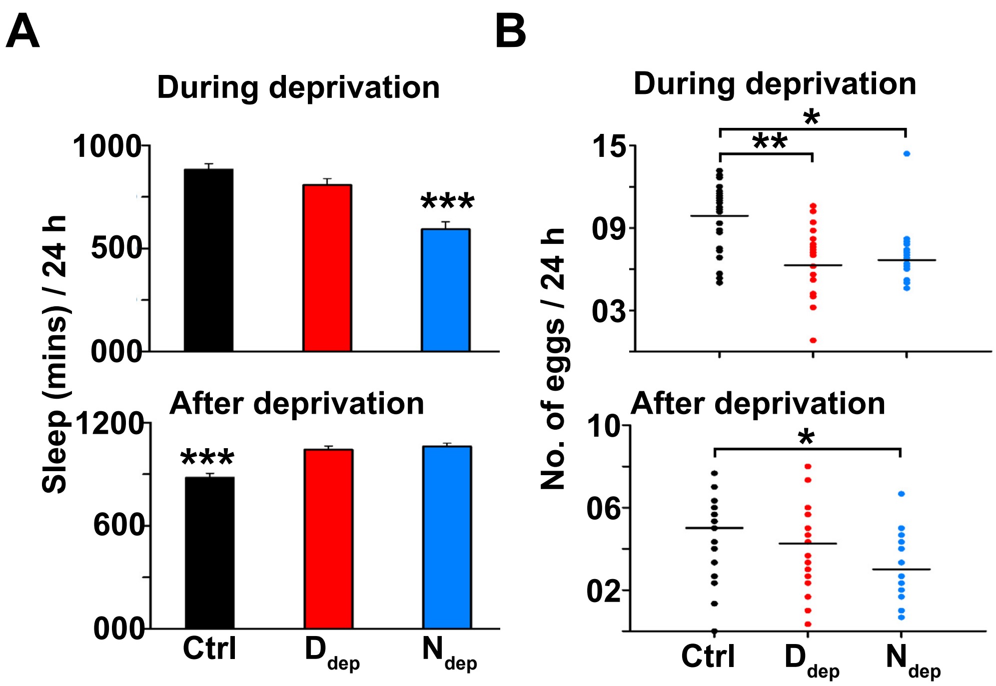

Fig. S3. (A) Total sleep (top) during 6 days of sleep deprivation and (bottom) averaged for 3 days post-deprivation. Sleep of N_{dep} (n = 16) flies is significantly lower than both control (n = 29) and D_{dep} (n = 21) flies during sleep deprivation, whereas both D_{dep} and N_{dep} flies sleep more after deprivation (one-way ANOVA followed by post-hoc Tukey's HSD test). (B) Average number of eggs laid (top) during sleep deprivation and (bottom) after sleep deprivation. D_{dep} and N_{dep} flies lay lesser number of eggs as compared to control flies during deprivation, but only N_{dep} flies lay lower number of eggs compared to control flies after deprivation (Kruskal-Wallis tests). All other details as in Figure 1.

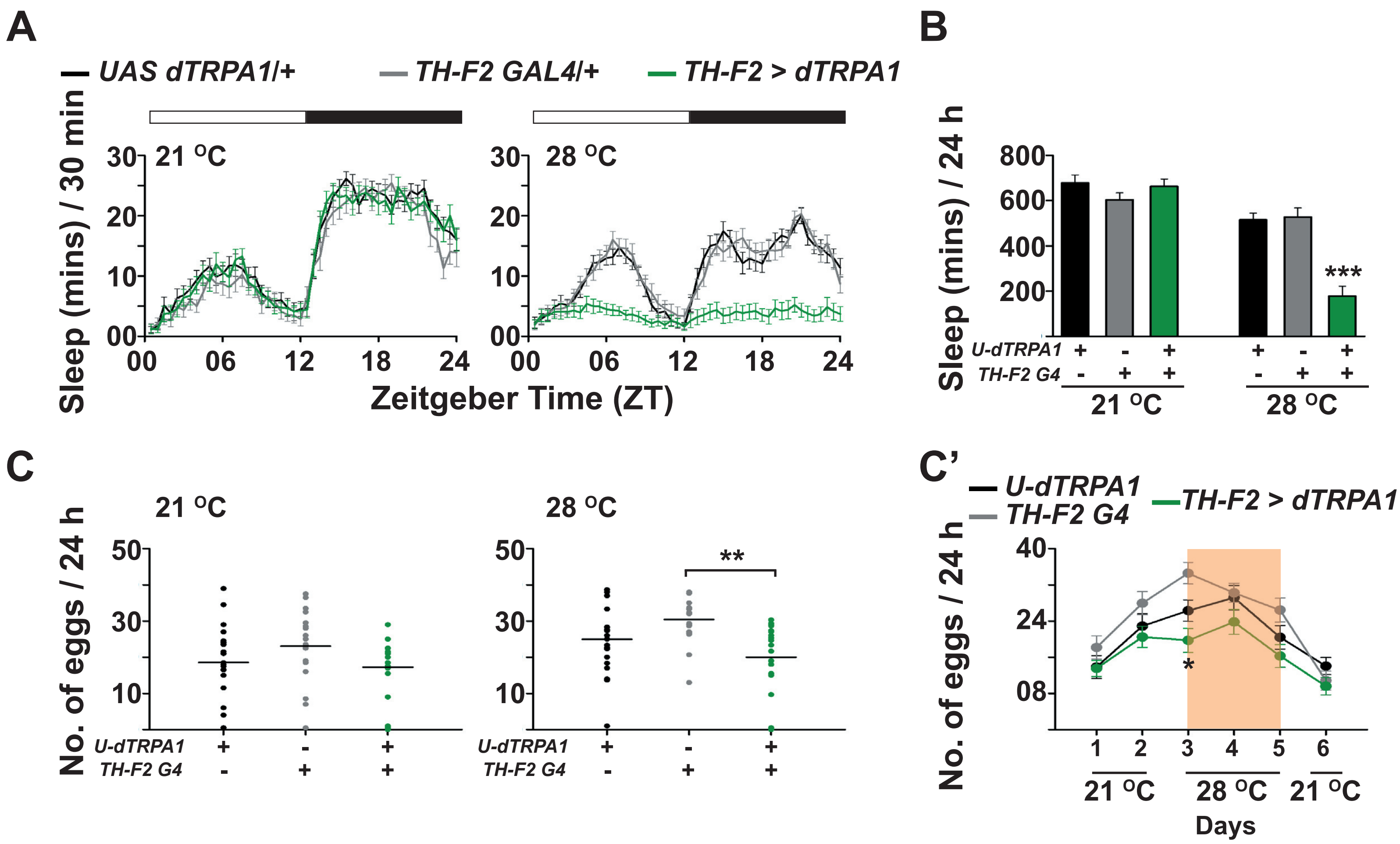

Fig. S4. (A) Sleep in minutes for every half hour over a period of 24 h averaged across two days at 21 °C (left) and three days at 28 °C (right) is shown for *UAS dTRPA1/+*(*n* = 22), *TH-F2 GAL4/+* (*n* = 23) and *TH-F2 GAL4 > UAS dTRPA1* (*n* = 23) flies. (B) At 21 °C, total sleep levels of all three genotypes is similar, whereas at 28 °C, *TH-F2 GAL4 > UAS dTRPA1* flies sleep significantly less than *UAS dTRPA1/+* and *TH-F2 GAL4/+* flies (two-way ANOVA with genotype and temperature as fixed factors followed by post-hoc Tukey's HSD test). (C) Total number of eggs laid averaged across two days at 21 °C (left) is similar across all genotypes, while average number of eggs laid by *TH-F2 GAL4 > UAS dTRPA1* (*n* = 20) flies is significantly lower than *TH-F2 GAL4/+* (*n* = 18) flies during the three days at 28 °C, but not from *UAS dTRPA1/+* flies (*n* = 20) (right, Kruskal-Wallis test). (C') Total number of eggs laid on all six days of the assay at different temperatures as indicated. *TH-F2 GAL4 > UAS dTRPA1* flies laid significantly lower number of eggs as compared to *UAS dTRPA1/+* and *TH-F2 GAL4/+* on the first day of 28 °C (Kruskal-Wallis test), while it showed a decreasing non-significant trend on the other two days of 28 °C. All flies laid similar number of eggs at 21 °C. All other details as in Figure 3.