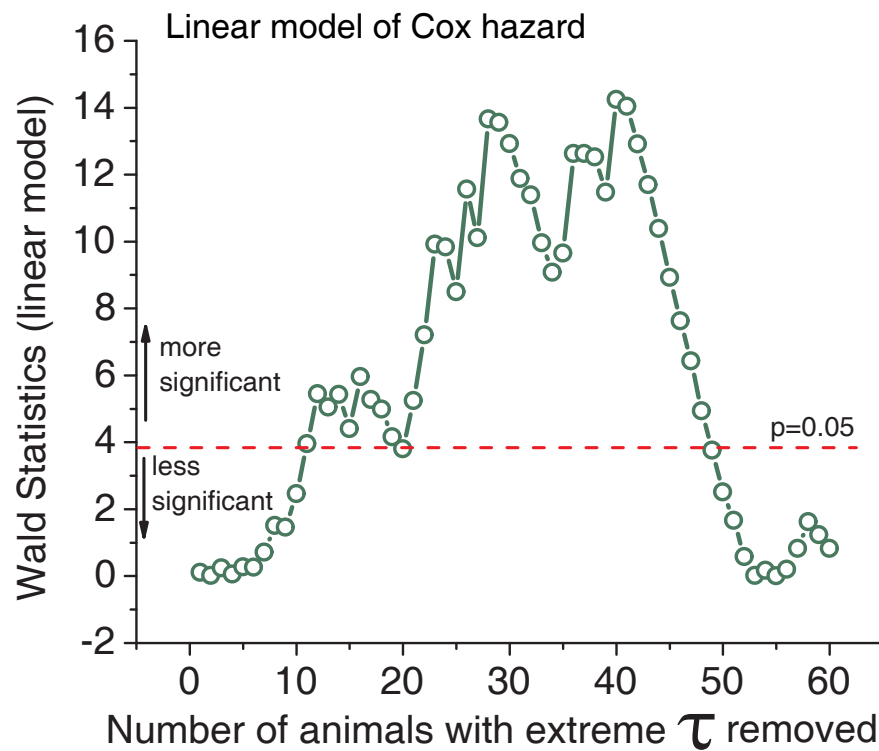


Supplementary Figure 1

A

| Cox proportional hazard statistics | | Model | Coef | SE (Coef) | Z | p-value |
|--|-----------|-----------|---------------------|-------------|-------|---------|
| Covariate | | | | | | |
| $\Delta\tau$ | Linear | Linear | 0.0053 | 0.01673 | 0.331 | 0.741 |
| | Quadratic | Quadratic | 0.1061 | 0.0623 | 1.702 | 0.088 |
| | Cubic | Cubic | 0.4593 | 0.132 | 3.46 | 0.00054 |
| $\Delta\tau$ (but including all the covariates in the model: glucose, GTT, activity, metabol., and weight) | | Cubic | $4.8 \cdot 10^{-4}$ | 1.59^{-4} | 3.042 | 0.00235 |

B



Supplementary Figure 1. Deviation of the innate circadian period $D\tau$ correlates with reduced longevity of mice.

A) The summary of Cox proportional hazard model for absolute value of $\Delta\tau$ ($|\Delta\tau|$) is presented. Cubic model demonstrates statistically significant influence of $|\Delta\tau|$ on survivorship ($p=0.00054$). The relationship remains significant if all the covariates measured in the study are included in the model ($p=0.00235$).

B) Linear Cox hazard model becomes statistically significant if animals with extreme $\Delta\tau$ are removed from the analysis. Wald statistics from Cox linear hazard model is plotted against number of animals with extreme $|\Delta\tau|$ removed.

Supplementary Figure 2

| Covariate | Model | Coef | SE (Coef) | Z | p-value |
|-------------------------------|--------|------------------------|-----------------------|--------|---------|
| Relative metabolic rate | Linear | -0.5824 | 3.51 | -0.166 | 0.868 |
| Voluntarily physical activity | Linear | -9.59×10^{-8} | 5.26×10^{-6} | -0.018 | 0.985 |
| Fasted glucose | Linear | 0.002 | 0.008 | 0.247 | 0.805 |
| GTT (area under curve) | Linear | -6.4×10^{-4} | 0.0011 | -0.577 | 0.564 |
| Weight | Linear | 0.0074 | 0.0352 | 0.209 | 0.834 |

Supplementary Figure 2. Metabolic rate, physical activity, weight, and glucose handling parameters do not linearly relate to the hazard via Cox proportional model. Summary of the linear Cox proportional hazard model is presented.

Supplementary Table 1.

| $\Delta\tau > 7 \text{ min}$ | | | | | $\Delta\tau < 7 \text{ min}$ | | | | |
|------------------------------|-------|------|----------|----------|------------------------------|-------|------|----------|----------|
| Time interval | alive | died | censored | survival | Time interval | alive | died | censored | survival |
| 0 | 52 | 0 | 0 | 1 | 0 | 24 | 0 | 0 | 1 |
| 481 | 51 | 0 | 1 | 1 | 536 | 23 | 0 | 1 | 1 |
| 508 | 50 | 1 | 0 | 0.980 | 602 | 22 | 0 | 1 | 1 |
| 583 | 49 | 1 | 0 | 0.961 | 857 | 21 | 1 | 0 | 0.955 |
| 602 | 48 | 1 | 0 | 0.941 | 866 | 20 | 1 | 0 | 0.909 |
| 603 | 47 | 1 | 0 | 0.922 | 873 | 19 | 1 | 0 | 0.864 |
| 625 | 46 | 1 | 0 | 0.902 | 911 | 18 | 1 | 0 | 0.818 |
| 647 | 45 | 1 | 0 | 0.882 | 950 | 17 | 1 | 0 | 0.773 |
| 676 | 44 | 1 | 0 | 0.863 | 966 | 16 | 1 | 0 | 0.727 |
| 789 | 43 | 1 | 0 | 0.843 | 1007 | 15 | 1 | 0 | 0.682 |
| 791 | 42 | 1 | 0 | 0.824 | 1030 | 14 | 1 | 0 | 0.636 |
| 806 | 41 | 1 | 0 | 0.804 | 1091 | 0 | 1 | 13 | 0.591 |
| 824 | 40 | 1 | 0 | 0.784 | | | | | |
| 838 | 39 | 1 | 0 | 0.765 | | | | | |
| 853 | 38 | 1 | 0 | 0.745 | | | | | |
| 857 | 37 | 1 | 0 | 0.725 | | | | | |
| 862 | 36 | 2 | 0 | 0.706 | | | | | |
| 865 | 34 | 1 | 0 | 0.667 | | | | | |
| 868 | 33 | 1 | 0 | 0.647 | | | | | |
| 869 | 32 | 1 | 0 | 0.627 | | | | | |
| 870 | 31 | 1 | 0 | 0.608 | | | | | |
| 874 | 30 | 1 | 0 | 0.588 | | | | | |
| 875 | 29 | 1 | 0 | 0.569 | | | | | |
| 885 | 28 | 1 | 0 | 0.549 | | | | | |
| 894 | 27 | 1 | 0 | 0.529 | | | | | |
| 908 | 26 | 1 | 0 | 0.510 | | | | | |
| 919 | 25 | 1 | 0 | 0.490 | | | | | |
| 926 | 24 | 1 | 0 | 0.471 | | | | | |
| 928 | 23 | 1 | 0 | 0.451 | | | | | |
| 937 | 22 | 1 | 0 | 0.431 | | | | | |
| 945 | 21 | 1 | 0 | 0.412 | | | | | |
| 951 | 20 | 1 | 0 | 0.392 | | | | | |
| 961 | 19 | 1 | 0 | 0.373 | | | | | |
| 973 | 18 | 1 | 0 | 0.353 | | | | | |
| 1009 | 17 | 1 | 0 | 0.333 | | | | | |
| 1077 | 16 | 1 | 0 | 0.314 | | | | | |
| 1083 | 15 | 1 | 0 | 0.294 | | | | | |
| 1091 | 0 | 0 | 15 | 0.294 | | | | | |

Supplementary Table 1. Raw data for the survival experiment on main figure 1I is presented. The table shows number of alive, dead, and censored (removed from the study due to non-aging morbidity) animals for each time interval of the study, as well as calculated survivorship.

Supplementary Table 2.

| $\Delta\tau < 0$ | | | | | $\Delta\tau \geq 0$ | | | | |
|------------------|-------|------|----------|----------|---------------------|-------|------|----------|----------|
| Time interval | alive | died | censored | survival | Time interval | alive | died | censored | survival |
| 0 | 43 | 0 | 1 | 1 | 0 | 33 | 0 | 0 | 1 |
| 481 | 42 | 0 | 1 | 1 | 536 | 32 | 0 | 1 | 1 |
| 508 | 41 | 1 | 0 | 0.976 | 583 | 31 | 1 | 0 | 0.969 |
| 603 | 40 | 1 | 0 | 0.952 | 602 | 30 | 1 | 1 | 0.938 |
| 625 | 39 | 1 | 0 | 0.929 | 676 | 28 | 1 | 0 | 0.903 |
| 647 | 38 | 1 | 0 | 0.905 | 789 | 27 | 1 | 0 | 0.871 |
| 791 | 37 | 1 | 0 | 0.881 | 806 | 26 | 1 | 0 | 0.839 |
| 824 | 36 | 1 | 0 | 0.857 | 866 | 25 | 1 | 0 | 0.806 |
| 838 | 35 | 1 | 0 | 0.833 | 868 | 24 | 1 | 0 | 0.774 |
| 853 | 34 | 1 | 0 | 0.810 | 873 | 23 | 1 | 0 | 0.742 |
| 857 | 33 | 2 | 0 | 0.786 | 874 | 22 | 1 | 0 | 0.710 |
| 862 | 31 | 2 | 0 | 0.738 | 875 | 21 | 1 | 0 | 0.677 |
| 865 | 29 | 1 | 0 | 0.690 | 894 | 20 | 1 | 0 | 0.645 |
| 869 | 28 | 1 | 0 | 0.667 | 908 | 19 | 1 | 0 | 0.613 |
| 870 | 27 | 1 | 0 | 0.643 | 911 | 18 | 1 | 0 | 0.581 |
| 885 | 26 | 1 | 0 | 0.619 | 919 | 17 | 1 | 0 | 0.548 |
| 926 | 25 | 1 | 0 | 0.595 | 950 | 16 | 1 | 0 | 0.516 |
| 928 | 24 | 1 | 0 | 0.571 | 966 | 15 | 1 | 0 | 0.484 |
| 937 | 23 | 1 | 0 | 0.548 | 1009 | 14 | 1 | 0 | 0.452 |
| 945 | 22 | 1 | 0 | 0.524 | 1077 | 13 | 1 | 0 | 0.419 |
| 951 | 21 | 1 | 0 | 0.500 | 1091 | 0 | 1 | 13 | 0.387 |
| 961 | 20 | 1 | 0 | 0.476 | | | | | |
| 973 | 19 | 1 | 0 | 0.452 | | | | | |
| 1007 | 18 | 1 | 0 | 0.429 | | | | | |
| 1030 | 17 | 1 | 0 | 0.405 | | | | | |
| 1083 | 16 | 1 | 0 | 0.381 | | | | | |
| 1091 | 0 | 0 | 16 | 0.381 | | | | | |

Supplementary Table 2. Raw data for the survival experiment on main figure 1J is presented. The table shows number of alive, dead, and censored (removed from the study due to non-aging morbidity) animals for each time interval of the study, as well as calculated survivorship.

Supplementary Table 3.

| Weight < 44 grams | | | | | Weight > 44 grams | | | | |
|-------------------|-------|------|----------|----------|-------------------|-------|------|----------|----------|
| Time interval | alive | died | censored | survival | Time interval | alive | died | censored | survival |
| 0 | 38 | 0 | 0 | 1 | 0 | 38 | 0 | 0 | 1 |
| 481 | 37 | 0 | 1 | 1 | 508 | 37 | 1 | 0 | 0.974 |
| 603 | 36 | 1 | 0 | 0.973 | 583 | 35 | 1 | 1 | 0.946 |
| 625 | 35 | 1 | 0 | 0.946 | 602 | 34 | 1 | 1 | 0.944 |
| 647 | 34 | 1 | 0 | 0.919 | 676 | 32 | 1 | 0 | 0.889 |
| 791 | 33 | 1 | 0 | 0.892 | 789 | 31 | 1 | 0 | 0.861 |
| 806 | 32 | 1 | 0 | 0.865 | 853 | 30 | 1 | 0 | 0.833 |
| 824 | 31 | 1 | 0 | 0.838 | 865 | 29 | 1 | 0 | 0.806 |
| 838 | 30 | 1 | 0 | 0.811 | 866 | 28 | 1 | 0 | 0.778 |
| 857 | 29 | 2 | 0 | 0.784 | 868 | 27 | 1 | 0 | 0.750 |
| 862 | 27 | 2 | 0 | 0.730 | 870 | 26 | 1 | 0 | 0.722 |
| 869 | 25 | 1 | 0 | 0.676 | 874 | 25 | 1 | 0 | 0.694 |
| 873 | 24 | 1 | 0 | 0.649 | 875 | 24 | 1 | 0 | 0.667 |
| 885 | 23 | 1 | 0 | 0.622 | 894 | 23 | 1 | 0 | 0.639 |
| 926 | 22 | 1 | 0 | 0.595 | 908 | 22 | 1 | 0 | 0.611 |
| 937 | 21 | 1 | 0 | 0.568 | 911 | 21 | 1 | 0 | 0.583 |
| 945 | 20 | 1 | 0 | 0.541 | 919 | 20 | 1 | 0 | 0.556 |
| 966 | 19 | 1 | 0 | 0.514 | 928 | 19 | 1 | 0 | 0.528 |
| 1009 | 18 | 1 | 0 | 0.486 | 950 | 18 | 1 | 0 | 0.500 |
| 1030 | 17 | 1 | 0 | 0.459 | 951 | 17 | 1 | 0 | 0.472 |
| 1083 | 16 | 1 | 0 | 0.432 | 961 | 16 | 1 | 0 | 0.444 |
| 1091 | 0 | 0 | 16 | 0.432 | 973 | 15 | 1 | 0 | 0.417 |
| | | | | | 1007 | 14 | 1 | 0 | 0.389 |
| | | | | | 1077 | 13 | 1 | 0 | 0.361 |
| | | | | | 1091 | 0 | 1 | 12 | 0.333 |

Supplementary Table 3. Raw data for the survival experiment on main figure 3C is presented. The table shows number of alive, dead, and censored (removed from the study due to non-aging morbidity) animals for each time interval of the study, as well as calculated survivorship.