

## Supplemental Figures

### Figure S1

#### Examples of the results obtained using a non-linear Lorentzian curve fitting

To calculate average activity over several days by correcting phase difference among days, the time of activity onsets was defined as “time 0”, and then average 6-min bin activity was calculated for several-day periods (for an example, days 56-70). And then, to compare the duration of the active phase among experimental conditions, the peak time of activity concentrated just before the offset was estimated by non-linear Lorentzian curve fitting.

### Figure S2

#### Effect of circadian dysfunction on hypercholesterolemia-induced arteriosclerosis in light and dark cycles at 20 weeks after exposure to the HFD

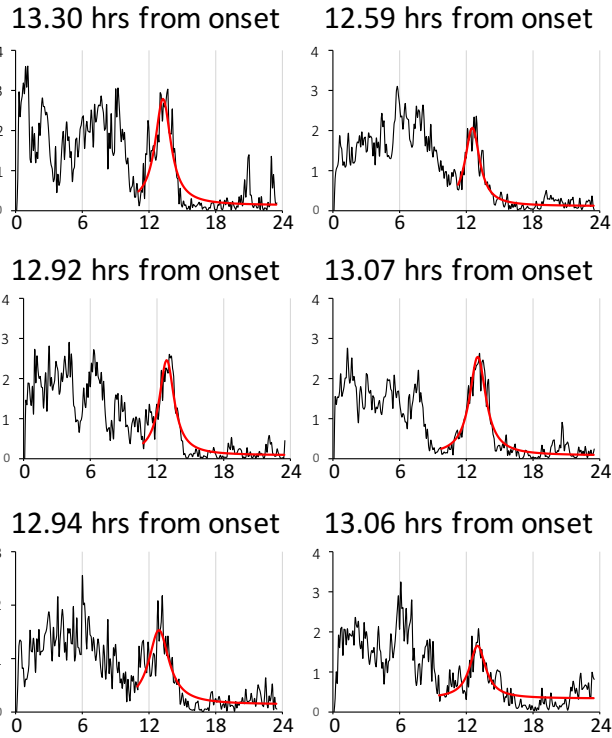
Male *Ldlr*<sup>-/-</sup> and *Ldlr*<sup>-/-</sup> *Per2*<sup>m/m</sup> mice were exposed to the HFD at 10-11 wk of age in light and dark, and maintained with the diet for a period of 20 weeks. (A) Body weight was measured at indicated time points. The data indicate the average  $\pm$  SE (n = 8 mice). A t-test was performed and statistical significance was defined as \*P < 0.05. (B and C) Mouse blood was collected 20 weeks after exposure to the HFD, and plasma concentrations of total cholesterol (T-CHO) and triglyceride (TG) were measured. The data indicate the average  $\pm$  SE (n = 8). The average concentrations in *Ldlr*<sup>-/-</sup> mice were set to 100%. A t-test was performed and statistical significance was defined as \*P < 0.05. (D) 20 weeks after exposure to the HFD, aortic samples were fixed in 10% neutral-buffered formalin, and then stained in Oil Red O working solution. Image analysis was performed using the ImageJ Software. The area (%) of aortic lesion in each animal was measured as the percentage of lesion area per total area of the aorta. Each dot indicates the lesion area from an individual mouse. The horizontal bold bars indicate the average of eight mice. A t-test was performed, but statistical significance (P < 0.05) was not achieved between *Ldlr*<sup>-/-</sup> and *Ldlr*<sup>-/-</sup> *Per2*<sup>m/m</sup> mice.

### Figure S3

#### Schematic summary of the relationship between hypercholesterolemia and circadian abnormalities

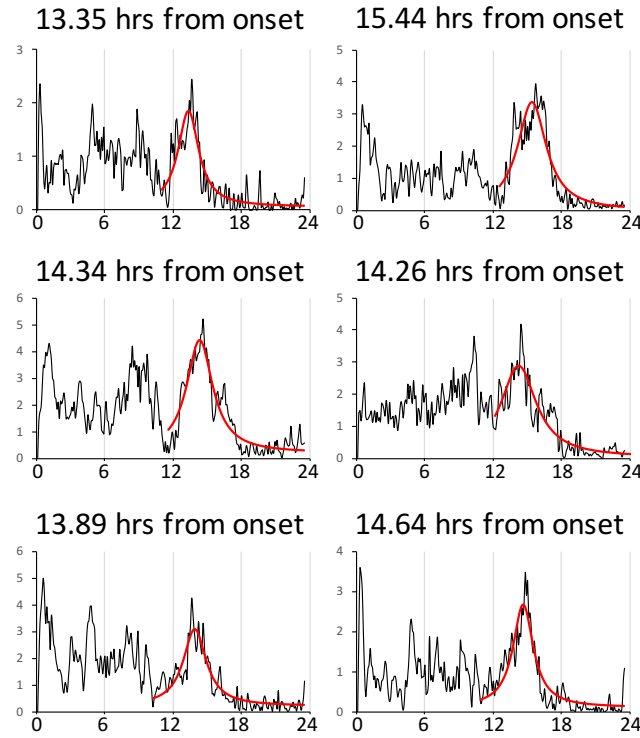
Figure S1

Wild-type (DD) Days 56-70 (n = 6)



The time of daily activity onset is defined as "time 0"

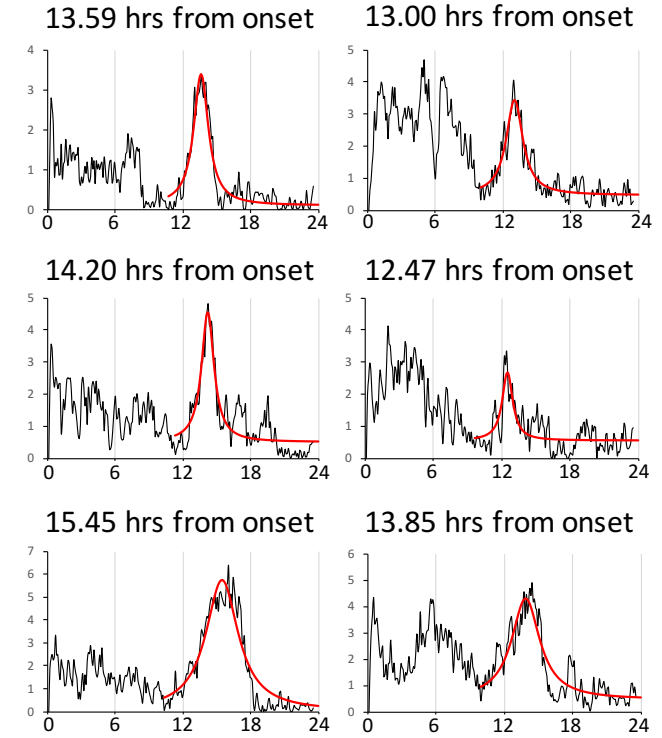
Wild-type, HFD (DD) Days 56-70 (n = 8)



13.40 hrs from onset

13.68 hrs from onset

*Ldlr*<sup>-/-</sup>, HFD (DD) Days 56-70 (n = 8)



13.36 hrs from onset

14.04 hrs from onset



Figure S3

