Supporting Information

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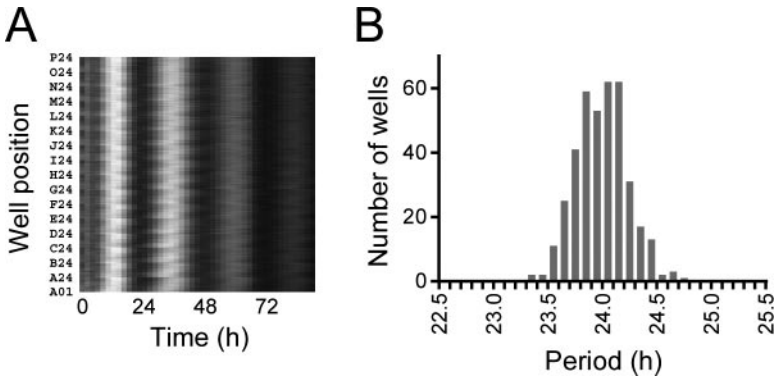


Fig. S1. Distribution of the period length on a 384-well plate screening setup. Luminescence rhythms of *Bmal1-dluc* cells were monitored by using ViewLux system. (*A*) The luminescence rhythms are indicated by raster plot. Each horizontal raster line represents a single well, with elapsed time plotted to right. Luminescence intensity data from each well are normalized for amplitude, and then indicated by gray scale: Peak is white and trough is black. (*B*) Frequency distribution of the period length from each well is indicated.

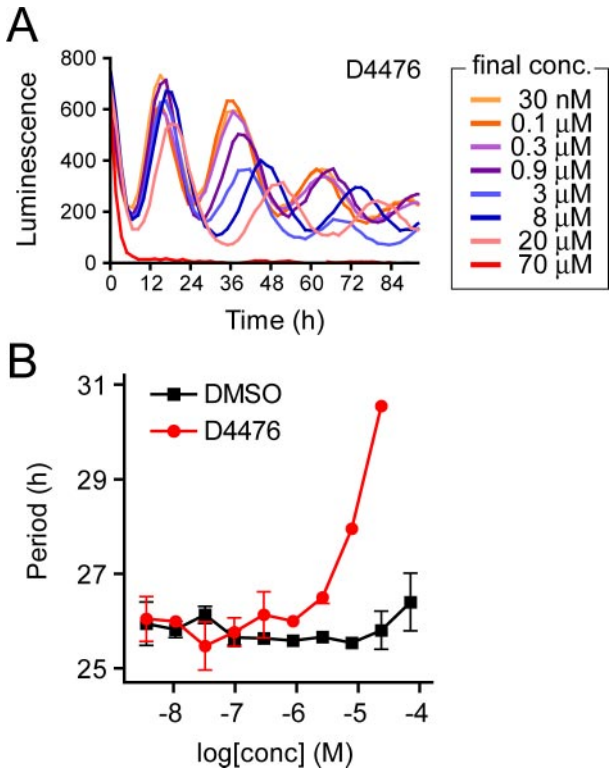


Fig. S2. Dose-dependent effect of CKIδ/ε inhibitor D4476 on the cellular circadian rhythm. Luminescence rhythms of *Bmal1-dluc* cells were monitored by using Tecan luminometer in the presence of various concentrations of D4476 (10 points of 3-fold dilution series; final 4 nM–70 μM). (*A*) Luminescence profiles are indicated. Data are the representative of duplicate experiment. (*B*) Period parameter was obtained by the curve fitting and plotted against final concentration of the compound. Data are the mean with variation of duplicate experiment. Similar result was obtained from another experiment.

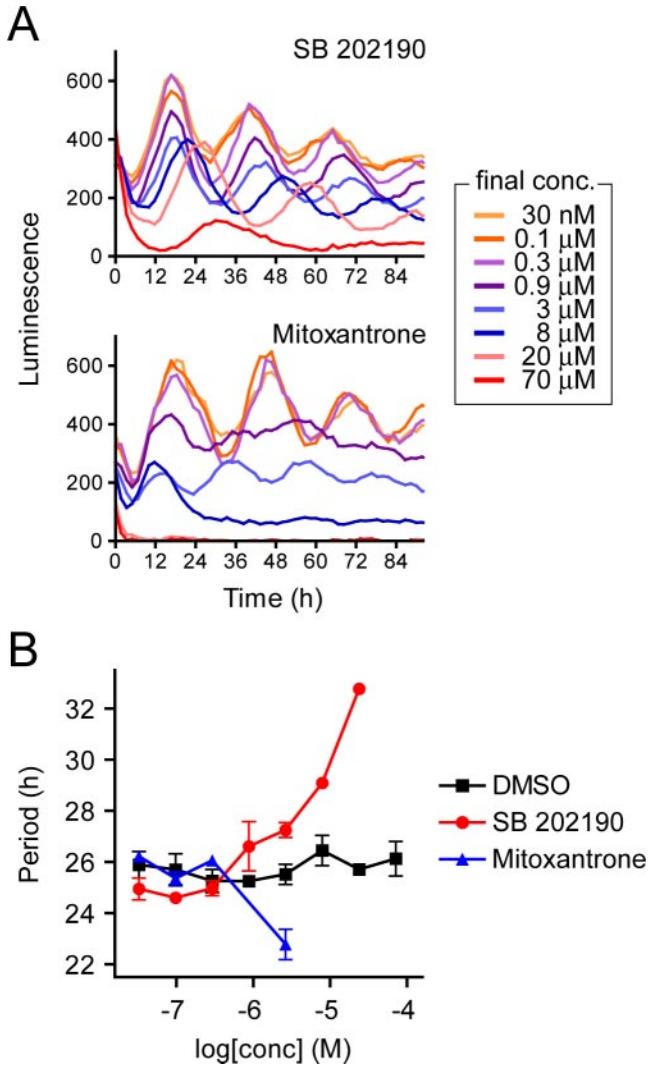


Fig. S3. Dose-dependent effect of SB 202190 and mitoxantrone. Luminescence rhythms of *Bmal1-dluc* cells were monitored by using Tecan luminometer in the presence of various concentrations of compounds (8 points of 3-fold dilution series; final 30 nM–70 μM). (*A*) Luminescence profiles are indicated for each compound. Data are the representative of duplicate experiment. (*B*) Period parameter was obtained by the curve fitting and plotted against final concentration of the compound. Data are the mean with variation of duplicate experiment.

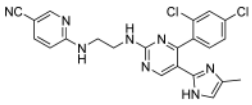
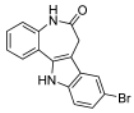
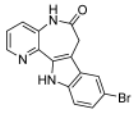
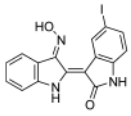
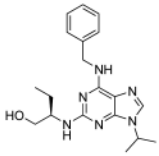
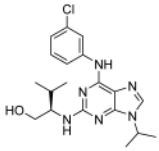
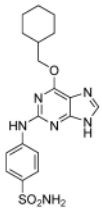
Compound name	Structure	*in vitro* IC_{50} (μM)	
		GSK-3	CDK
Chir99021		0.010 (GSK-3α) 0.007 (GSK-3β)	8.8 (CDK1-cyclin B)
Kenpaullone		0.23 (GSK-3β)	0.67 (CDK2-cyclin A)
1-Azakenpaullone		0.018 (GSK-3β)	2.0 (CDK1-cyclin B)
Indirubin-3'-monooxime, 5 iodo-		0.009 (GSK-3β)	0.025 (CDK1-cyclin B)
Roscovitine		>10 (GSK-3β)	0.25 (CDK2-cyclin A)
Purvalanol A		>10 (GSK-3β)	0.1 (CDK2-cyclin A)
NU6102		No data	0.009 (CDK1-cyclin B) 0.006 (CDK2-cyclin A)

Fig. S4. Structure of CDK and GSK-3 inhibitors. Values indicate in vitro IC_{50} (μM) against CDK and GSK-3 reported in the references 26–29 of the main text.

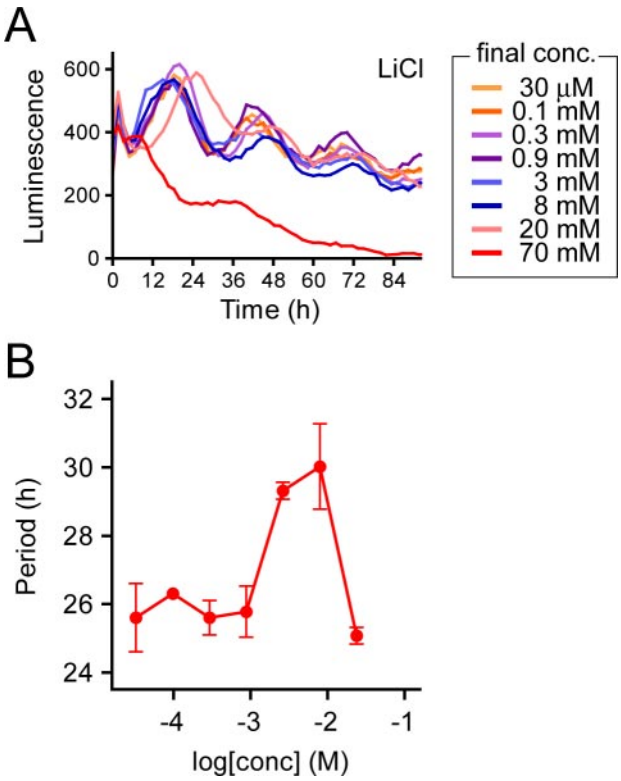


Fig. S5. Dose-dependent effect of LiCl. Luminescence rhythms of *Bmal1-dluc* cells were monitored by using Tecan luminometer in the presence of various concentrations of LiCl (8 points of 3-fold dilution series; final 30 μM–70 mM). (*A*) Luminescence profiles are indicated. Data are the representative of duplicate experiment. (*B*) Period parameter was obtained by the curve fitting and plotted against final concentration of the compound. Data are the mean with variation of duplicate experiment.

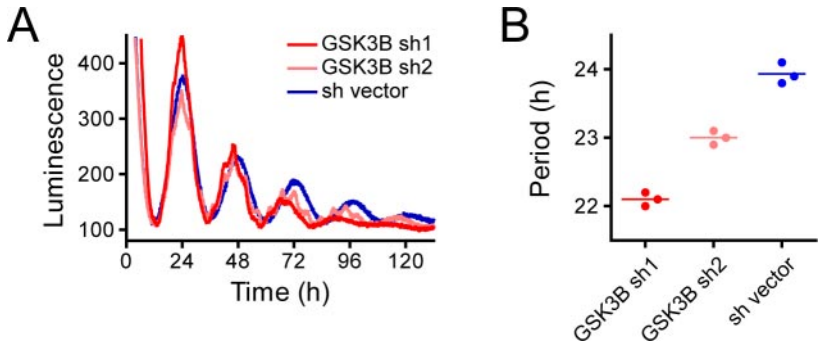


Fig. S6. Effect of GSK-3β shRNA on the circadian rhythm in mouse primary fibroblasts. shRNA lentiviral vectors were purchased from Sigma. Lentivirus production, infection of *Per2*^{Luc} primary fibroblasts, luminescence recording, and data analysis were performed by using the method described in ref. 13 of the main text. (*A*) Luminescence profiles are indicated for each shRNA. Data are the representative of triplicate experiment. (*B*) Period parameter was obtained by the curve fitting and plotted. Data from each profile is shown by a circle, and mean period is indicated by a horizontal bar.

Other Supporting Information

SI Appendix