Figure S1. Rodenfels *et al*.

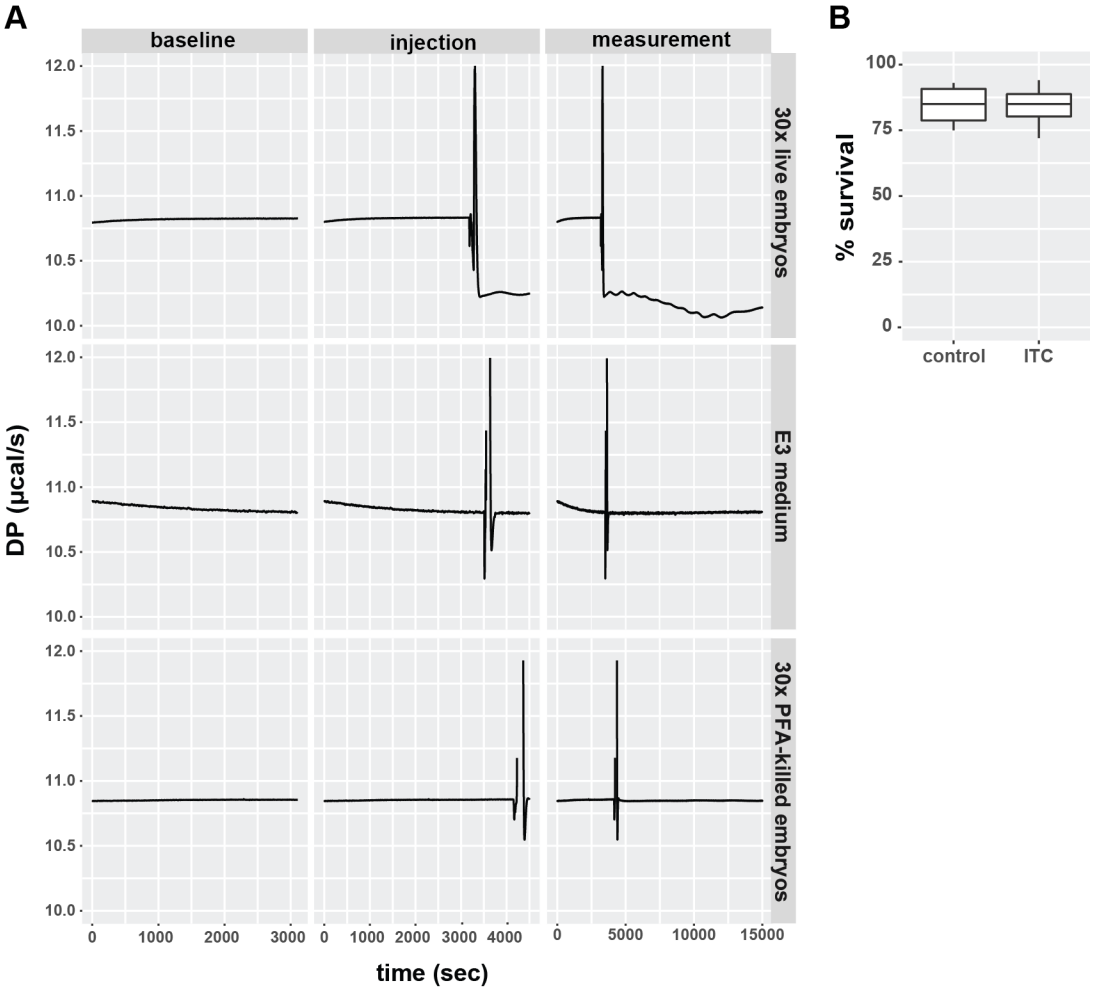

Figure S1. Raw ITC data traces of WT, E3 medium and PFA-fixed embryos and embryonic post- measurement survival, related to Figure 1. (A) Raw data traces from a single ITC experiment with either 30 living embryos, E3 medium alone or 30 PFA-killed embryos showing the three steps (baseline recording, injection & measurement) of the ITC experiment described in Fig 1A. (B) Quantification of survival of 30 control or 30 embryos recovered from an ITC experiment at 24h post measurement, n=3 (groups of 30 embryos).

Figure S2. Rodenfels *et al*.

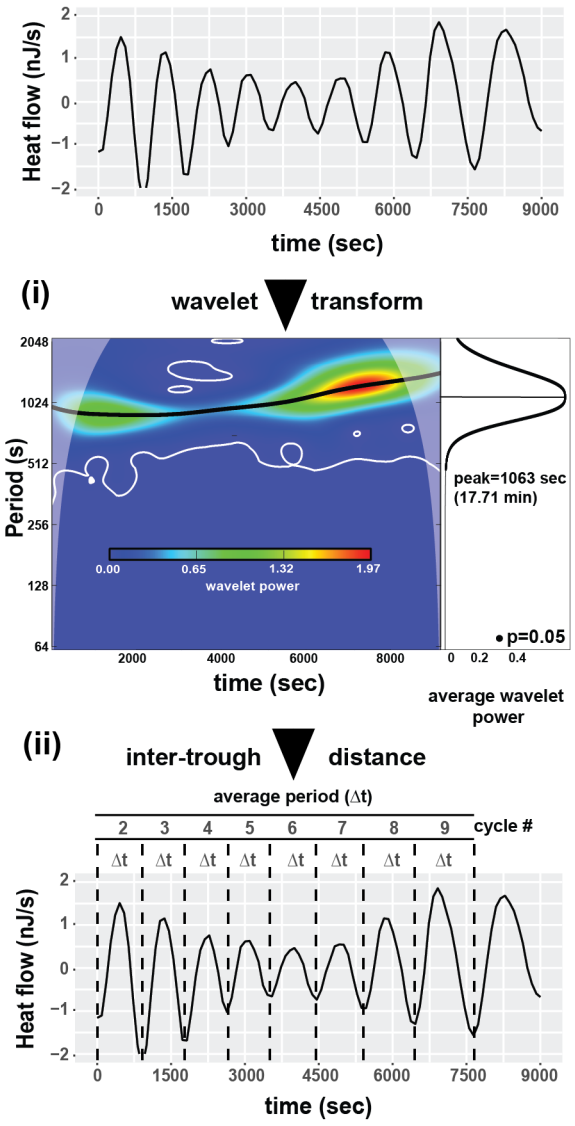

Figure S2. Oscillatory heat flow period determination, related to Figure 2. (A) The oscillatory heat flow period has been determined by wavelet-transformation (i) and inter-trough distance (II) of the decomposed oscillatory heat flow component for each biological replicate

Figure S3. Rodenfels *et al*.

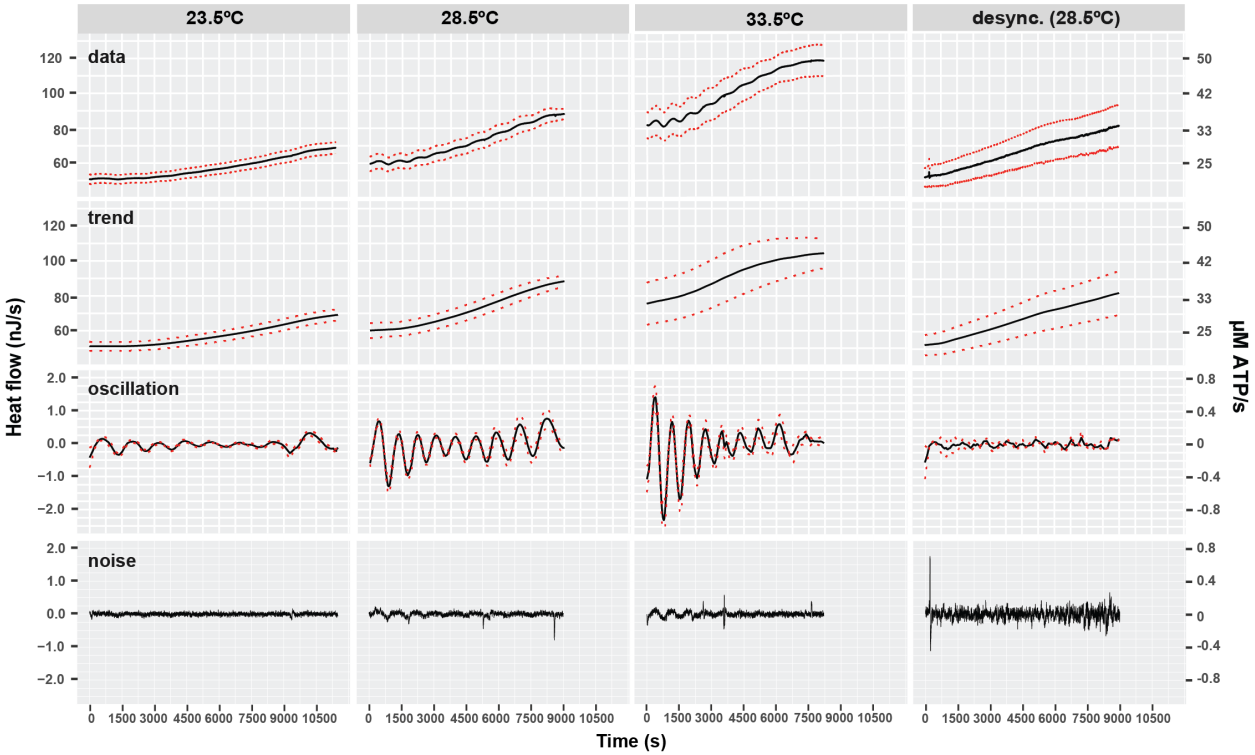

Figure S3. Mean heat flow of synchronized and desynchronized embryos at different temperatures, related to Figure 2. (A) Measured heat flow of synchronized embryos at 23.5ºC, 28.5ºC, 33.5 ºC and de-synchronized embryos at 28.5ºC and their decomposition into their trend, oscillatory and noise component plotted against time. black line=mean, red dotted line=SEM, n=11 (23.5ºC), n=10 (28.5ºC), n=8 (33.5ºC), n=6 (de-synchronized, 28ºC).

Figure S4. Rodenfels *et al.*

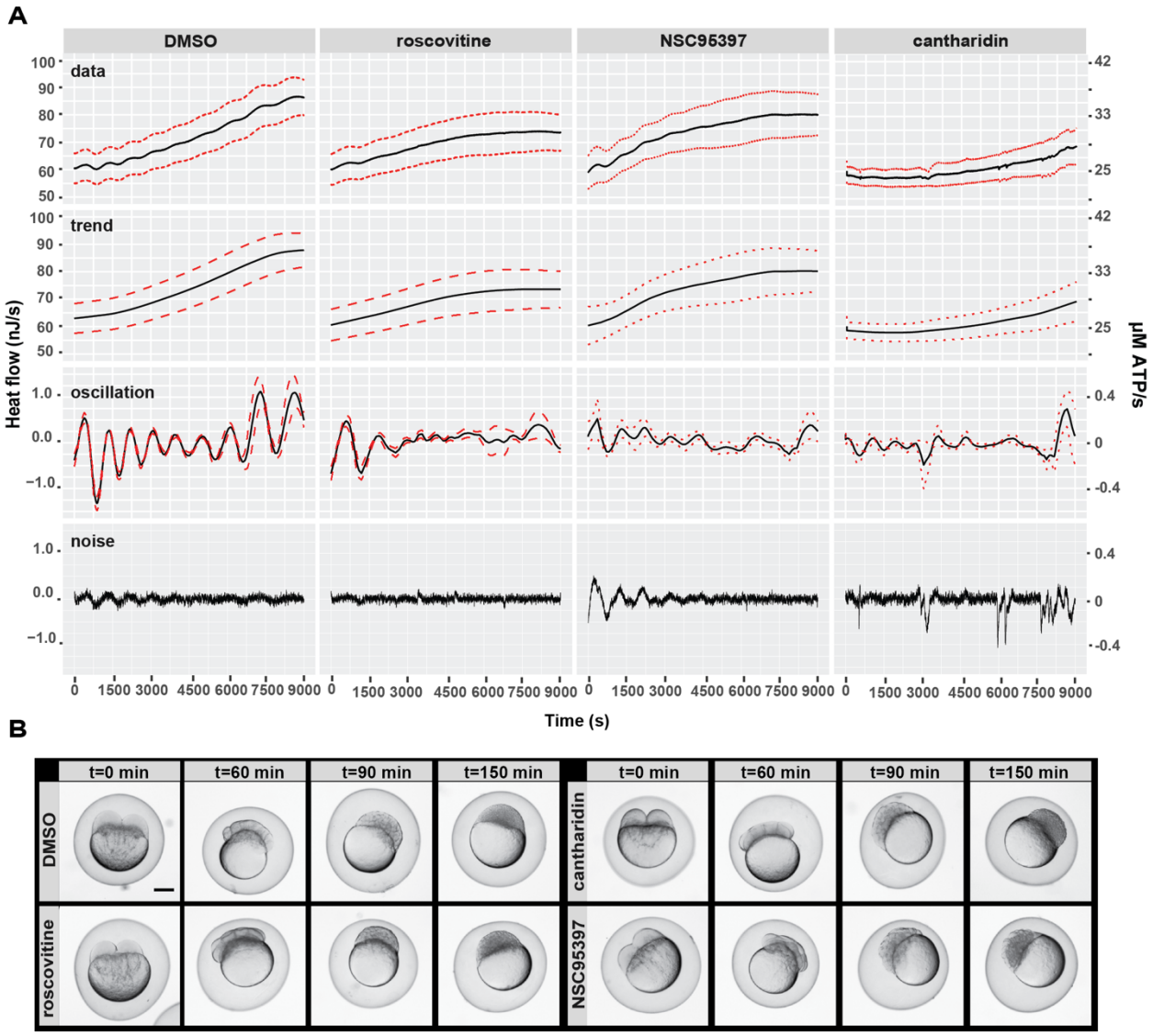

Figure S4. Mean heat flow and development of wild-type embryos treated with different cell cycle signaling inhibitors, related to Figure 4. (A) Measured heat flow of DMSO, roscovitine NSC95397 and cantharidin treated embryos and their decomposition into their trend, oscillatory and noise component plotted against time. black line=mean, red dotted line=SEM, n=6. (B) Micrographs of DMSO, roscovitine, NSC95397 and cantharidin treated embryos developing from the 2-cell (t=0 min, time of drug administration) to 1k/high stage (t=150 min). Scale bar=250 µm.

Figure S5. Rodenfels *et al*.

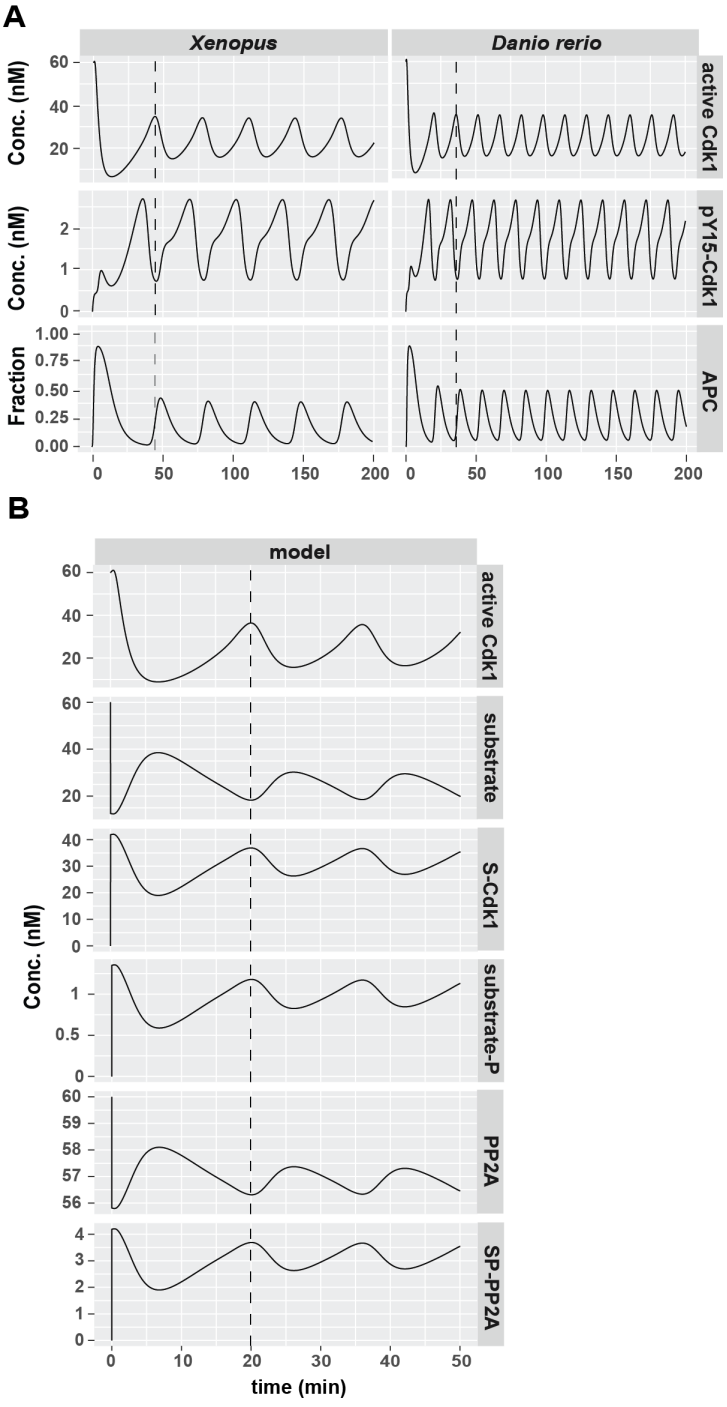

Figure S5. Modeled *Xenopus* and *Danio rerio* cell cycle oscillators (Module 1) and modeling results of enzymes and substrates of Module 2, related to Figure 6. (A)Modeled *Xenopus* and *Danio rerio* cell cycle oscillators. *Danio rerio* model was adjusted only by changing the cyclin synthesis rate and Cdk1 on and off rates for cyclin binding (See Module 1 Figure 4A). (B) Modeled time change in the enzymes and substrates concentrations of the phosphorylation/de-phosphorylation cycles of Cdk1 targets depicted in module 2 (see main Figure 5A).

Figure S6. Rodenfels *et al*.

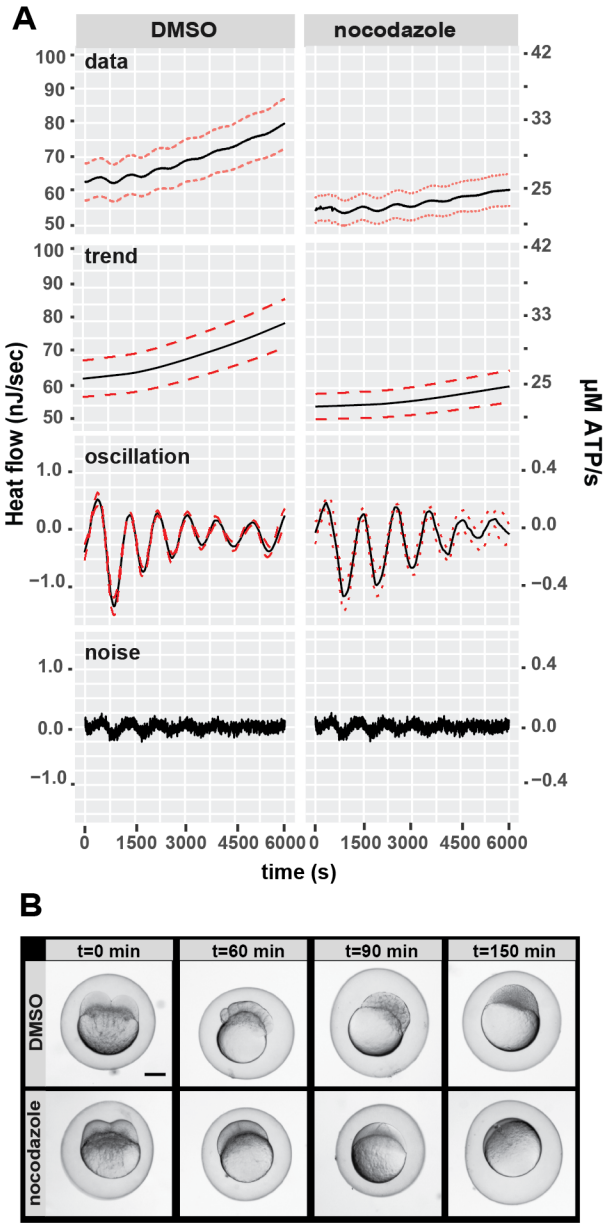

Figure S6. Mean heat flow and embryonic development of wild-type embryos treated with nocodazole, related to Figure 7. (A) Measured heat flow of DMSO and nocodazole treated embryos and their decomposition into their trend, oscillatory and noise component plotted against time. black line=mean, red dotted line=SEM, n=6. (B) Micrographs of DMSO and nocodazole treated embryos developing from the 2-cell (t=0 min, time of drug administration) to 1k/high stage (t=150 min). Scale bar=250 µm.