Table S1. Primer sequences used in the study.

Gene	Forward sequence (5' → 3')	Reverse sequence (5' → 3')	Product size (bp)
SdhA [1]	CATGCTGCTGTGTTCCGCGA	ACCATCCAGGGGCTTGCTGA	133
Act5C [1]	GGCGCAGAGCAAGCGTGGTA	GGGTGCCACACGCAGCTCAT	124
RpL32 [2]	ATGCTAAGCTGTCGCACAAATG	GTTCGATCCGTAACCGATGT	107
eEF1α2 [2]	GCGTGGGTTTGTGATCAGTT	GATCTTCTCCTTGCCCATCC	125
Clk	TCGCTGGTCAACGATCTCAG	GCGATCGGTGGCCTCATTAT	117
cyc [3]	TGGACAATCACCCGAACATAC	CTGAGGCAGGAAACCAATCA	113
per [4]	TGATGGGCGACTACAACTCC	GTCGCTATTCCCATTGCTGT	89
tim [4]	GGTGGCATCTGTGTACGAAA	GATCTCGGTTCGCTCAAGTC	118
Pdp1	GGCCACATAACCACAAAGCG	GGAGGCGAACGAAAATGTTGA	108
vri [4]	ATGAACAACGTCCGGCTATC	CTGCGGACTTATGGATCCTC	114
cry	AGGAATTTGTTCACGAGCCCT	GCTCCGGATAATGGACTCCG	84
Hsp83	CATACAAGATGCCAGAAGAAGCA	AGATCAACTCGCGCAGGAAA	120
Fst	ATCGTGCAGGAACAGAGGTG	TGACCATTTTCGCCATCCCA	86
smp-30 [5]	GAAGGACCATTGTTCCCTGA	TGGGTGGTTGGAATTTTGAT	140

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Table S2. Three-way ANOVAs for the mesor, amplitude, and phase of gene expression in *Drosophila* heads.

		Main effects			Interaction			
	Gene	**Age**	**Sex**	**Temperature**	**Age x Sex**	**Age x Temperature**	**Sex x Temperature**	**Age x Sex x Temperature**
Mesor	***Clk***	**<0.0001**	**0.000**	**<0.0001**	0.951	**<0.0001**	0.794	0.312
	cyc	**<0.0001**	**<0.0001**	0.528	**0.014**	**<0.0001**	0.162	0.446
	per	**<0.0001**	**0.004**	**0.036**	0.224	**0.000**	0.911	**0.042**
	tim	**0.013**	**<0.0001**	**<0.0001**	0.290	**<0.0001**	0.118	**0.003**
	Pdp1	**<0.0001**	**<0.0001**	**<0.0001**	0.345	**<0.0001**	**0.005**	**<0.0001**
	vri	**<0.0001**	**0.005**	**<0.0001**	**0.044**	**0.000**	**0.012**	0.950
	cry	**0.024**	**0.022**	0.901	0.093	0.076	**0.038**	0.094
	Hsp83	**<0.0001**	0.507	0.276	0.306	**<0.0001**	**<0.0001**	0.177
	Fst	**0.030**	0.341	**0.004**	0.197	0.114	0.847	0.215
	smp-30	**<0.0001**	**<0.0001**	**0.006**	**0.000**	0.187	0.165	**0.031**
Amplitude	***Clk^***	**<0.0001**	-	**<0.0001**	-	**0.001**	-	-
	Clk†	-	**0.008**	0.208	-	-	0.546	-
	cyc*	0.188	**0.032**	-	0.977	-	-	-
	per	**0.001**	0.089	**0.001**	0.572	0.143	0.940	0.248
	tim	0.790	**<0.0001**	**<0.0001**	0.510	**<0.0001**	0.115	**0.015**
	Pdp1	**0.001**	**0.020**	**0.016**	0.371	**<0.0001**	**0.025**	**0.047**
	vri	0.646	0.101	0.089	0.218	0.055	**0.004**	0.875
	cry‡	0.571	-	0.068	-	0.061	-	-
	cry†	-	0.306	**0.001**	-	-	**0.019**	-
	Hsp83*	**<0.0001**	**<0.0001**	-	0.838	-	-	-
	Fst	NA	NA	NA	NA	NA	NA	NA
	smp-30	NA	NA	NA	NA	NA	NA	NA
Phase	***Clk^***	0.206	-	0.078	-	0.151	-	-
	Clk	-	0.078	**<0.0001**	-	-	0.360	-
	cyc*	0.394	0.637	-	0.111	-	-	-
	per	0.372	0.795	**<0.0001**	0.777	0.903	0.973	0.499
	tim	0.903	0.458	0.396	0.110	0.898	**0.042**	0.785
	Pdp1	0.393	0.831	**0.050**	0.773	0.872	**0.041**	**0.028**
	vri	0.636	0.211	**0.004**	0.092	**0.017**	0.648	0.431
	cry‡	0.426	-	**0.002**	-	**0.001**	-	-
	cry†	-	0.547	**0.049**	-	-	0.063	-
	Hsp83*	**0.001**	0.858	-	**0.006**	-	-	-
	Fst	NA	NA	NA	NA	NA	NA	NA
	smp-30	NA	NA	NA	NA	NA	NA	NA

Bold text show significant values ($p<0.05$). CircaCompare was used to make pairwise comparisons of simple effects where main effects or interactions were significant. Two-way ANOVAs were performed when one or more profiles being compared were non-rhythmic ($p>0.05$) and a three-way ANOVA could not be performed. Missing values denoted by 'NA' are shown when neither a three-way or a two-way ANOVA could be computed from the available rhythmic profiles. In these cases, pairwise comparisons were made using CircaCompare. Rhythmicity was not taken into account in the calculation for mesor, so three-way ANOVAs were performed. The following annotations indicate the configurations of the two-way ANOVAs: *cyc**, a two-way ANOVA was performed (2 levels sex, 2 levels age) for the T_{CYC} profiles; *Clk^*, a two-way ANOVA was performed (2 levels age, 2 levels temperature) for the male profiles; *Clk†*, a two-way ANOVA was performed (2 levels sex, 2 levels temperature) for the aged profiles; *cry‡*, a two-way ANOVA was performed (2 levels age, 2 levels temperature) for the female profiles; *cry†*, a two-way ANOVA was performed (2 levels sex, 2 levels temperature) for the aged profiles; *Hsp83** a two-way ANOVA was performed (2 levels sex, 2 levels age) for the T_{CYC} profiles.

Table S3. Table of p-values of pairwise comparisons made in CircaCompare for gene expression in *Drosophila* heads.

	Heads			*Clk*	*cyc*	*per*	*tim*	*Pdp1*	*vri*	*cry*	*Hsp83*	*Fst*	*smp-30*
Mesor	**Effect of age**	**Male**	**T_{CON}**	0.239	**0.000**	**0.014**	**0.000**	0.083	0.158	**0.000**	**0.000**	0.130	**0.000**
			T_{CYC}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.878	**0.000**	0.398	**0.013**
		Female	**T_{CON}**	**0.011**	**0.000**	**0.000**	**0.000**	**0.020**	0.414	0.369	**0.000**	0.185	**0.000**
			T_{CYC}	**0.000**	**0.000**	**0.003**	**0.000**	**0.000**	**0.001**	0.697	**0.000**	0.104	**0.000**
	Effect of temperature	**Male**	**Young**	**0.000**	0.183	0.148	**0.000**	**0.000**	**0.002**	0.216	0.758	0.798	0.645
			Aged	0.465	**0.005**	**0.000**	0.370	**0.006**	**0.016**	**0.046**	**0.000**	0.067	**0.000**
		Female	**Young**	**0.000**	**0.009**	0.849	**0.000**	**0.000**	**0.002**	0.194	**0.001**	**0.022**	**0.000**
			Aged	0.545	0.222	**0.039**	0.170	0.052	0.426	**0.000**	0.414	**0.000**	**0.000**
	Effect of gender	**T_{CON}**	**Young**	**0.017**	**0.004**	**0.002**	**0.000**	**0.000**	0.080	**0.000**	**0.015**	0.176	**0.000**
			Aged	**0.003**	**0.000**	0.055	**0.000**	**0.000**	**0.000**	0.121	**0.000**	0.252	0.075
		T_{CYC}	**Young**	0.308	**0.031**	0.927	0.488	0.223	0.601	0.959	0.178	0.479	0.188
			Aged	**0.001**	**0.000**	**0.009**	**0.000**	**0.000**	0.081	0.756	**0.001**	**0.005**	**0.000**
Amplitude	**Effect of age**	**Male**	**T_{CON}**	0.676	n.r.	0.342	**0.000**	**0.043**	0.838	**0.009**	**#**	0.246	**#**
			T_{CYC}	**0.000**	0.435	**0.017**	**0.014**	**0.001**	0.154	**#**	**0.000**	**#**	n.r.
		Female	**T_{CON}**	0.639	n.r.	**0.005**	**0.005**	0.149	0.079	**0.023**	**#**	0.690	**#**
			T_{CYC}	**#**	0.147	0.245	**0.005**	**0.004**	0.564	0.438	**0.000**	0.604	**#**
	Effect of temperature	**Male**	**Young**	**0.000**	**#**	0.749	**0.000**	**0.000**	0.051	**#**	**#**	0.547	**#**
			Aged	0.253	**#**	**0.003**	0.171	0.385	0.109	0.487	**0.000**	**#**	n.r.
		Female	**Young**	**#**	**#**	0.141	**0.000**	0.450	0.771	0.981	**0.000**	0.435	**#**
			Aged	0.581	**#**	**0.041**	0.677	**0.036**	**0.025**	**0.000**	**#**	0.278	**#**
	Effect of gender	**T_{CON}**	**Young**	0.522	n.r.	**0.043**	**0.000**	**0.007**	0.076	0.133	**#**	0.544	0.361
			Aged	**0.009**	n.r.	0.292	**0.000**	**0.032**	**0.000**	0.338	**#**	0.159	n.r.
		T_{CYC}	**Young**	**#**	0.261	0.983	0.434	0.742	0.429	**#**	**0.004**	0.437	n.r.
			Aged	0.193	**0.035**	0.132	**0.000**	0.479	0.933	**0.022**	**0.000**	**#**	**#**
Phase	**Effect of age**	**Male**	**T_{CON}**	**0.008**	n.r.	0.252	0.093	0.133	0.520	0.445	n.r.	n.r.	n.r.
			T_{CYC}	0.927	0.091	0.805	0.708	0.330	0.054	n.r.	**0.001**	n.r.	n.r.
		Female	**T_{CON}**	0.216	n.r.	0.863	0.094	**0.012**	**0.045**	**0.031**	n.r.	n.r.	n.r.
			T_{CYC}	n.r.	0.579	0.603	0.337	0.595	0.806	**0.013**	0.711	n.r.	n.r.
	Effect of temperature	**Male**	**Young**	0.863	n.r.	**0.016**	0.607	0.438	0.830	n.r.	n.r.	n.r.	n.r.
			Aged	**0.001**	n.r.	**0.002**	0.530	0.063	**0.000**	**0.017**	0.607	n.r.	n.r.
		Female	**Young**	n.r.	n.r.	**0.029**	0.083	0.068	0.320	**0.004**	0.586	n.r.	n.r.
			Aged	**0.007**	n.r.	**0.000**	**0.014**	**0.011**	**0.000**	0.932	n.r.	n.r.	n.r.
	Effect of gender	**T_{CON}**	**Young**	0.100	n.r.	0.637	**0.006**	**0.031**	0.304	0.171	n.r.	n.r.	**0.023**
			Aged	**0.028**	n.r.	0.271	0.622	0.225	0.937	0.401	n.r.	n.r.	n.r.
		T_{CYC}	**Young**	n.r.	0.281	0.843	0.737	0.309	0.233	n.r.	0.277	n.r.	n.r.
			Aged	0.599	0.471	0.933	**0.002**	0.734	0.536	0.061	**0.015**	n.r.	n.r.

Bold text show significant values ($p<0.05$). 'n.r.' indicate comparisons where one or both profiles being compared were non-rhythmic ($p>0.05$). The annotation '#' indicate significant changes in rhythmicity, where a rhythmic profile was being compared with a non-rhythmic profile, and was considered a significant change in amplitude.

Table S4. Three-way ANOVAs for the mesor, amplitude, and phase of gene expression in *Drosophila* bodies.

		Main effects			Interaction			
		Age	**Sex**	**Temperature**	**Age x Sex**	**Age x Temperature**	**Sex x Temperature**	**Age x Sex x Temperature**
Mesor	***Clk***	0.278	**<0.0001**	**0.017**	**0.019**	0.787	**0.004**	0.112
	cyc	**<0.0001**	**<0.0001**	**0.025**	**0.004**	0.482	**0.020**	0.230
	per	0.409	**<0.0001**	0.185	0.288	0.547	0.495	0.250
	tim	**<0.0001**	**<0.0001**	0.134	**<0.0001**	**0.001**	**0.040**	**0.001**
	Pdp1	**<0.0001**	**<0.0001**	0.053	**<0.0001**	**0.038**	**<0.0001**	**0.011**
	vri	0.352	**<0.0001**	**0.004**	0.332	0.343	0.796	0.233
	cry	**<0.0001**	**<0.0001**	**0.017**	**<0.0001**	0.524	0.109	0.404
	Hsp83	**<0.0001**	**<0.0001**	0.101	**<0.0001**	**0.006**	0.575	**0.044**
	Fst	0.148	**0.015**	**0.004**	0.745	**0.012**	0.427	0.658
	smp-30	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**
Amplitude	***Clk***	**0.039**	**<0.0001**	0.132	0.511	0.298	0.106	0.667
	cyc	NA	NA	NA	NA	NA	NA	NA
	per	0.646	**<0.0001**	**<0.0001**	0.713	0.086	0.053	0.076
	tim	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**0.001**	**0.005**	**0.000**
	Pdp1	**0.011**	**<0.0001**	**0.017**	**<0.0001**	**0.002**	**0.001**	**0.028**
	vri	0.145	**<0.0001**	**0.026**	**0.016**	0.174	0.906	0.146
	cry	**<0.0001**	**<0.0001**	0.182	**<0.0001**	0.251	0.598	0.432
	Hsp83*	**0.005**	**0.032**	-	0.271	-	-	-
	Fst	NA	NA	NA	NA	NA	NA	NA
	smp-30	NA	NA	NA	NA	NA	NA	NA
Phase	***Clk***	0.696	0.159	**<0.0001**	0.421	0.506	0.897	0.274
	cyc	NA	NA	NA	NA	NA	NA	NA
	per	0.518	0.161	**0.007**	0.735	0.207	0.637	0.727
	tim	**0.007**	**0.002**	**0.029**	0.113	0.215	0.300	0.521
	Pdp1	0.703	0.071	**0.028**	0.527	0.471	0.391	0.582
	vri	0.280	0.374	0.069	0.417	**0.002**	0.912	0.730
	cry	0.872	0.702	0.106	0.625	0.948	0.276	0.657
	Hsp83*	0.065	**0.007**	-	**0.046**	-	-	-
	Fst	NA	NA	NA	NA	NA	NA	NA
	smp-30	NA	NA	NA	NA	NA	NA	NA

Bold text show significant values ($p<0.05$). CircaCompare was used to make pairwise comparisons of simple effects where main effects or interactions were significant. Two-way ANOVAs were performed when one or more profiles being compared were non-rhythmic ($p>0.05$) and a three-way ANOVA could not be performed. Missing values denoted by 'NA' are shown when neither a three-way or a two-way ANOVA could be computed from the available rhythmic profiles. In these cases, pairwise comparisons were made using CircaCompare. Rhythmicity was not taken into account in the calculation for mesor, so three-way ANOVAs were performed. *hsp** indicates a two-way ANOVA (2 levels age, 2 levels sex) was performed for the T_{CYC} profiles for *Hsp83*.

Table S5. Table of p-values of pairwise comparisons made in CircaCompare for gene expression in *Drosophila* bodies.

	Bodies			*Clk*	*cyc*	*per*	*tim*	*Pdp1*	*vri*	*cry*	*Hsp83*	*Fst*	*smp-30*
Mesor	Effect of age	Male	T_{CON}	**0.005**	0.166	0.270	**0.000**	**0.000**	0.414	**0.000**	**0.000**	0.197	**0.000**
			T_{CYC}	0.620	0.126	0.586	**0.001**	**0.000**	0.539	**0.000**	**0.001**	**0.013**	**0.000**
		Female	T_{CON}	**0.043**	0.211	**0.022**	0.281	**0.023**	0.090	**0.000**	**0.000**	0.088	**0.000**
			T_{CYC}	0.969	**0.003**	0.070	0.348	**0.002**	0.092	**0.000**	**0.000**	**0.006**	0.165
	Effect of temperature	Male	Young	0.213	0.281	0.922	0.055	0.224	0.077	0.592	0.839	0.364	0.685
			Aged	**0.003**	**0.050**	0.150	**0.001**	**0.000**	0.271	**0.000**	**0.006**	**0.021**	**0.000**
		Female	Young	0.491	0.356	0.289	**0.007**	**0.039**	0.590	0.549	0.422	0.980	**0.003**
			Aged	0.158	**0.012**	0.912	**0.003**	**0.009**	**0.000**	0.268	**0.001**	**0.007**	**0.000**
	Effect of gender	T_{CON}	Young	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.001**	**0.000**
			Aged	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.211	**0.000**
		T_{CYC}	Young	**0.000**	**0.000**	**0.005**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.003**	**0.000**
			Aged	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Amplitude	Effect of age	Male	T_{CON}	**0.023**	n.r.	**0.003**	**0.000**	**0.000**	**0.015**	**0.000**	**#**	n.r.	n.r.
			T_{CYC}	0.696	0.514	0.476	**0.045**	0.225	0.695	**0.000**	**0.000**	0.174	**#**
		Female	T_{CON}	0.104	n.r.	0.947	0.184	0.262	0.406	**0.000**	n.r.	n.r.	**#**
			T_{CYC}	0.562	n.r.	0.913	0.634	**0.025**	0.484	**0.010**	0.294	**#**	n.r.
	Effect of temperature	Male	Young	0.551	**#**	0.319	0.924	0.839	0.807	0.988	**0.000**	**#**	n.r.
			Aged	**0.049**	**#**	**0.000**	**0.000**	**0.000**	0.058	**0.000**	**#**	**#**	**#**
		Female	Young	0.553	n.r.	**0.039**	0.147	0.267	**0.041**	0.780	**#**	n.r.	**#**
			Aged	0.691	n.r.	**0.010**	0.401	0.940	0.105	**0.027**	**#**	**#**	n.r.
	Effect of gender	T_{CON}	Young	**0.000**	n.r.	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**#**	n.r.	n.r.
			Aged	**0.000**	n.r.	**0.000**	**0.000**	**0.049**	**0.000**	0.211	n.r.	n.r.	**#**
		T_{CYC}	Young	**0.000**	**#**	**0.002**	**0.000**	**0.000**	**0.000**	**0.000**	0.093	**#**	**#**
			Aged	**0.000**	**#**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.321	0.985	n.r.
Phase	Effect of age	Male	T_{CON}	0.299	n.r.	0.402	0.226	0.405	0.130	0.857	n.r.	n.r.	n.r.
			T_{CYC}	0.245	**0.025**	0.783	0.775	0.440	0.165	0.948	**0.000**	0.915	n.r.
		Female	T_{CON}	0.705	n.r.	0.181	**0.012**	0.691	**0.024**	0.638	n.r.	n.r.	n.r.
			T_{CYC}	0.467	n.r.	0.791	0.309	0.584	0.362	0.914	0.929	n.r.	n.r.
	Effect of temperature	Male	Young	**0.040**	n.r.	0.234	0.292	0.210	0.469	0.348	0.452	n.r.	n.r.
			Aged	**0.000**	n.r.	0.131	0.758	0.383	**0.035**	0.054	n.r.	n.r.	n.r.
		Female	Young	**0.003**	n.r.	0.824	**0.045**	0.139	0.310	0.729	n.r.	n.r.	n.r.
			Aged	**0.031**	n.r.	0.113	0.518	0.373	**0.009**	0.930	n.r.	n.r.	n.r.
	Effect of gender	T_{CON}	Young	0.414	n.r.	0.421	**0.048**	0.176	0.384	0.952	n.r.	n.r.	n.r.
			Aged	0.486	n.r.	0.555	0.242	0.189	0.953	0.405	n.r.	n.r.	n.r.
		T_{CYC}	Young	0.271	n.r.	0.778	0.379	0.949	0.331	0.717	0.598	n.r.	n.r.
			Aged	0.893	n.r.	0.785	0.668	0.141	0.893	0.313	**0.000**	**0.002**	n.r.

Bold text show significant values ($p<0.05$). 'n.r.' indicate comparisons where one or both profiles being compared were non-rhythmic ($p>0.05$). The annotation '#' indicate significant changes in rhythmicity, where a rhythmic profile was being compared with a non-rhythmic profile, and was considered a significant change in amplitude.