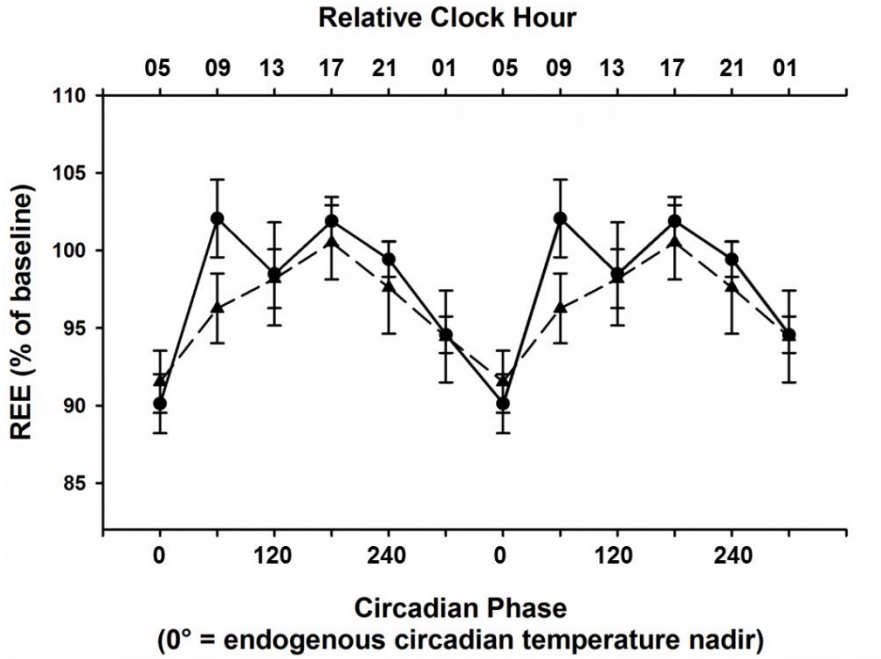

Figure S1. Circadian Variation of Fasting Resting Energy Expenditure during Week 1 and Week 3. Related to Figure 2.

The REE from week 1 (black circles) of recurrent circadian disruption is plotted with respect to the circadian phase at which the measurements were taken. REE from Week 3 (triangles and dashed line) are also plotted with respect to the circadian phase at which it was assessed. No significant difference in fasting levels or timing of REE was detected between week 1 and week 3. Data are double-plotted and represented as mean ± SEM. For reference, a relative clock hour time scale illustrating the approximate time of day is shown on the upper axis, with 05:00 referenced to the endogenous circadian temperature nadir.

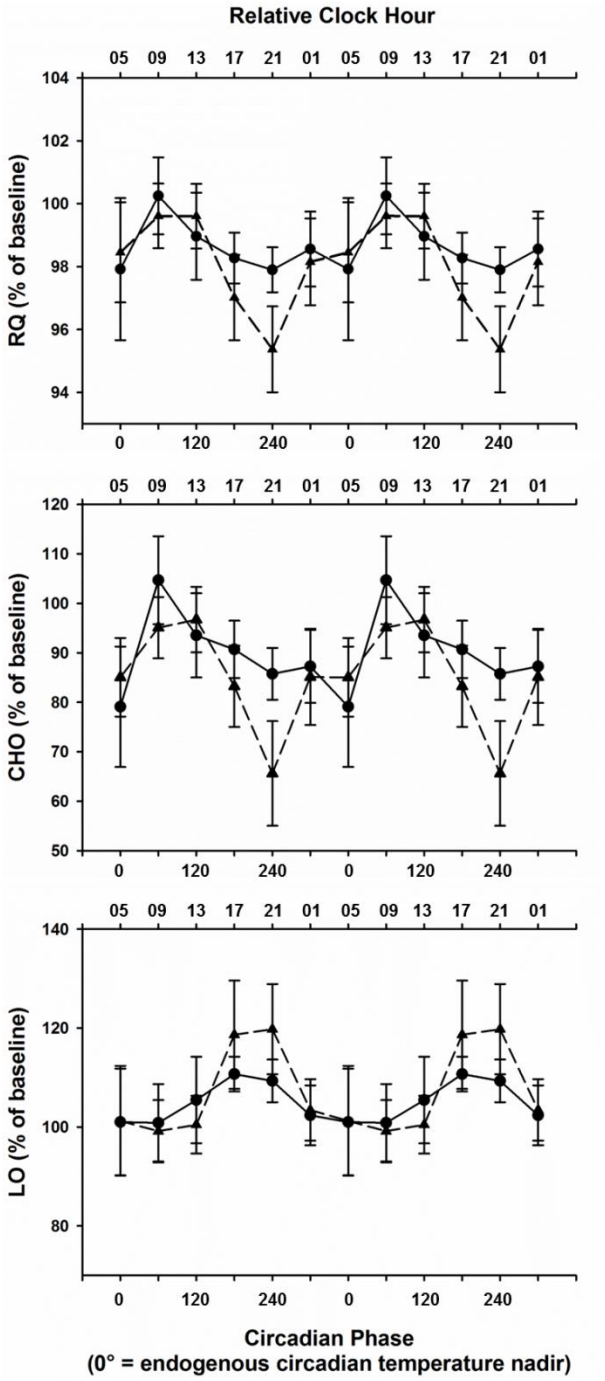

Figure S2. Circadian Variation of Fasting Respiratory Quotient, Carbohydrate, and Lipid Oxidation during Week 1 and Week 3. Related to Figure 3.

Fasting RQ (Top panel), CHO (Middle panel), and LO (Bottom panel) from week 1 (black circles) and week 3 (triangles and dashed line) of recurrent circadian disruption is plotted with respect to the circadian phase at which the measurements were taken. No significant difference in fasting levels or timing of RQ were detected between week 1 and week 3. Data in all three panels are double-plotted and represented as mean ± SEM.

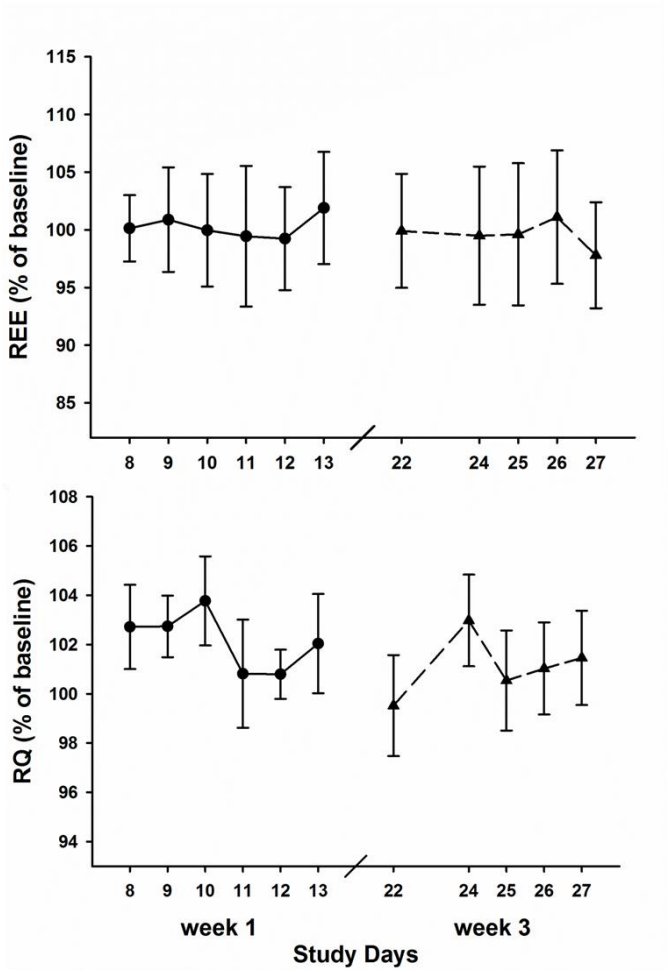

Figure S3. Day-to-Day Variation of Fasting Resting Energy Expenditure and Respiratory Quotient During Week 1 and Week 3 in the Control Group. Related to Figure 2 and Figure 3.

Fasting REE (Top panel) and RQ (Bottom panel) from week 1 (black circles) and week 3 (triangles and dashed line) of control participants is plotted with respect to the study day at which the measurements were taken. All measurements were taken within ~2 hours of the scheduled wake time, which remained consistent from baseline through the end of the study. No significant differences in fasting levels of REE or RQ were detected between week 1 and week 3. Data in both panels are single-plotted and presented as mean ± SEM.

Participant	Age	Gender	BMI	Group	Diet	Baseline kcal/day	Intervention kcal/day	Baseline REE (kcal/day)	Baseline RQ	Baseline phase
3436HY	60	female	19.8	control	regular	1288	1288	1059	0.82	n/a
3369HY42	58	male	27.0	control	regular	1952	1952	1137	0.82	n/a
3547HY	55	male	24.9	control	regular	2079	1853	1426	0.81	n/a
3552HY*	55	female	31.0	control	regular	1822	1822	1607	0.85	n/a
3776HY	60	male	29.2	control	HF	2737	2487	1396	0.83	n/a
3789HY	57	female	24.4	control	HF	2280	2280	1279	0.91	n/a
3453HY52**	63	male	30.1	RCD	regular	2102	2102	1537	0.86	39.3
3539HY	69	female	20.5	RCD	regular	1356	1509	1152	0.81	70.0
3536HY52	57	female	30.8	RCD	regular	1930	1930	1406	0.83	45.8
3552HY62*	56	female	32.1	RCD	regular	1877	2035	1551	0.83	48.1
3453HY73**	65	male	30.5	RCD	HF	2715	2715	1465	0.84	35.0
3552HY73*	56	female	31.4	RCD	HF	2314	2501	1564	0.83	54.0
2056HY75	38	male	21.0	RCD	HF	2728	2728	1452	0.87	4.0

Table S1. Demographics. Related to Figure 2, Figure 3 and Figure 4.
10 participants completed 13 studies. Participants were randomized into circadian disruption (RCD) and control groups, and were given either a regular diet or a high fat (HF) diet during their study. One female participant (3552*) completed the study three times (control regular diet; RCD regular diet; RCD high fat diet) and one male participant (3453**) completed the study twice (RCD regular diet; RCD high fat diet). No participant completed the study more than once in the same condition.