Supplementary methods

Thryroid hormones, hypothalamic gene expression, and blood glucose: We measured plasma TSH and T3 using the Milliplex Rat Thyroid Hormone Panel from Millipore (Cat #RTHY-30K) according to the manufacturer's instructions.

We measured neuropeptide expression in whole hypothalamus. We extracted RNA using a QIAGEN miniprep RNA extraction kit. We synthesized cDNA and performed quantitative RT-PCR using iScript cDNA Synthesis kit (Bio-Rad) and iQ Supermix (Bio-Rad) respectively, according to the manufacturer's protocols. Alternatively, for some genes, we performed qPCR using pre-designed and validated taqman PCR primer/probes sets (Applied Biosystems) on an ABI 7900HT Real-Time PCR System (Applied Biosystems, Inc.). We calculated mRNA expression relative to housekeeping genes, L32 (LPL, Bio-Rad) or 18S (others, ABI) using the $\Delta\Delta$CT method, as in [30].

We measured blood glucose from trunk blood in duplicate using Accu-chek glucometers and test strips (Roche).

***In vitro* lentivirus studies:** The Institutional Biosafety Committee at the University of Cincinnati approved all lentivirus protocols.

Lentivirus generation: Mitch Lazar (Univeresity of Pennsylvania) kindly provided plasmid DNA pCMX that contains the VP16 activation domain and mouse PPARγ (NM_011146 .3)[14]. We cloned the VP16-PPARγ fragment into the lentivirus vector. America Pharma Source packaged, produced and concentrated the VP16-PPARγ lentivirus and its scrambled control (10^8 viral units μl^{-1}). America Pharma Source designed and produced a lentivirus expressing an shRNA against rat PPARγ (NM_013124), 10^6 viral units μl^{-1}, and its scrambled control.

Cell culture and lentivirus verification: We maintained IVB cells (rat hypothalamic cell line) in DMEM high-glucose medium containing 10% fetal bovine serum and antibiotics (100 U ml^{-1} penicillin and 100 μg ml^{-1} streptomycin) in a humidified incubator at 37C, 95%O_2, 5%CO_2. We conducted viral infection according the manufacture's protocol. Briefly, we seeded the cells in a 24-well plate so they would be 40-50% confluent on the following day. On the day of infection, we replaced the culture media with 200 μl of virus stock (1E+7pfu) and incubated the cells at 37C, 95%O_2, and 5%CO_2 overnight. We then replaced the viral media with fresh culture media for an additional 48 h before harvested for RNA isolation. We isolated RNA and synthesized cDNA as above. We verified expression of the VP16 domain by PCR. We ran the PCR product on an 8% polyacrylamide TBE gel and visualized using Bio-Rad Quantity One imaging system. We calculated PPARγ mRNA expression relative to β-Actin by quantitative RT-PCR using the Bio-Rad system, as above.