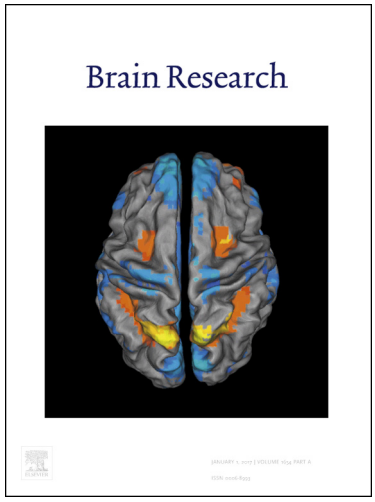

Diet-induced insulin resistance state disturbs brain clock processes and alters tuning of clock outputs in the Sand rat, *Psammomys obesus*

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Diet-induced insulin resistance state disturbs brain clock processes and alters tuning of clock outputs in the Sand rat, *Psammomys obesus*

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Abstract

Reciprocal interactions closely connect energy metabolism with circadian rhythmicity. Altered clockwork and circadian desynchronization are often linked with impaired energy regulation. Conversely, metabolic disturbances have been associated with altered autonomic and hormonal rhythms. The effects of high-energy (HE) diet on the master clock in the suprachiasmatic nuclei (SCN) remain unclear.This question was addressed in the Sand rat (*Psammomys obesus*), a non-insulin-dependent diabetes mellitus (NIDDM) animal model. The aim of this work was to determine whether enriched diet in *Psammomys* affects locomotor activity rhythm, as well as daily oscillations in the master clock of the SCN and in an extra-SCN brain oscillator, the piriform cortex. Sand rats were fed during 3 months with either low or HE diet. Vasoactive intestinal peptide (VIP), vasopressin (AVP) and CLOCK protein cycling were studied by immunohistochemistry and running wheel protocol was used for behavioral analysis. High energy feeding dietary triggered hyperinsulinaemia, impaired insulin/glucose ratio and disruption in

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