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Thermal biology of two sympatric gerbil species: the physiological basis of temporal partitioning

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Abstract

Sympatric species can coexist through ecological resource partitioning as for example for habitat, food or time. However, a detailed understanding of the basic thermal physiology, crucial for temporal partitioning, is currently lacking, especially for the desert rodents. Here, we compare the physiological performance with regard to thermal energetics and morphological traits of two sympatric gerbils from the Gobi desert of Inner Mongolia, China. The diurnally active *Meriones unguiculatus* and the nocturnally active *M. meridianus*. The diurnal *M. unguiculatus* had more brown adipose tissue (BAT) mass and capacity for non-shivering thermogenesis (NST), a higher resting metabolic rate (RMR) at low ambient temperatures (T_a) and a lower upper critical temperature of the thermal neutral zone (TNZ) than the nocturnal *M. meridianus.* The overall thermal conductance and lower critical temperatures of *M. meridianus* were also lower than that of *M. unguiculatus*, permitting the former to maintain a stable body temperature (T_b) when exposed to high T_a. We found no differences in body mass, and total evaporative water loss (TEWL) between the two