

## Energetic adaptations of Shetland pony mares

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Recent results suggest that wild Northern herbivores exhibit signs of a hypometabolism during times of low ambient temperature and food shortage in order to reduce their energetic needs. However, there are speculations that domestic animals lost the ability to reduce energy expenditure. To examine energetic and behavioural responses 10 Shetland pony mares were exposed to different environmental conditions (summer and winter). During winter ponies were allocated into two groups receiving two different food quantities (60% and 100% of maintenance energy requirement). We measured the field metabolic rate, water turn over, body temperature, locomotor activity, lying time, resting heart rate, body mass and body condition score.

In summer, the field metabolic rate of all ponies (FMR;  $63.4 \pm 15.0$  MJ/day) was considerably higher compared with food restricted and control animals in winter ( $24.6 \pm 7.8$  and  $15.0 \pm 1.1$  MJ/day, respectively). Furthermore, during summer, locomotor activity, resting heart rate and total water turnover were significantly elevated ( $P < 0.001$ ) compared with winter. Animals receiving a reduced amount of food ( $N=5$ ) reduced their FMR by 26% compared with control animals ( $N=5$ ) to compensate for the decreased energy supply. Furthermore, resting heart rate, body mass and body condition score were lower ( $29.2 \pm 2.7$  beats/min,  $140 \pm 22$  kg and  $3.0 \pm 1.0$  points, respectively) than in control animals ( $36.8 \pm 4.1$  beats/min,  $165 \pm 31$  kg,  $4.4 \pm 0.7$  points;  $P < 0.05$ ). While no difference could be found in the observed behaviour, nocturnal hypothermia was elevated in restrictively fed

animals. Our results indicate that ponies adapt to different climatic conditions by changing their metabolic rate, behaviour and some physiological parameters. When exposed to energy shortage, ponies, like wild herbivores, exhibited hypometabolism and nocturnal hypothermia.

### Keywords:

**Body temperature, Energy expenditure, Food restriction, Hypometabolism, Locomotor activity, Shetland pony**

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