Quantitative Genetics of Bioenergetics and Growth-Related Traits in the Wild Mammal, Phyllotis Darwini

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Abstract

We studied the potential for response to selection in typical physiological-thermoregulatory traits of mammals such as maximum metabolic rate (MMR), nonshivering thermogenesis (NST) and basal metabolic rate (BMR) on cold-acclimated animals. We used an animal model approach to estimate both narrow-sense heritabilities (h^2) and genetic correlations between physiological and growth-related traits. Univariate analyses showed that MMR presented high, significant heritability (h^2= 0.69±0.35, asymptotic standard error), suggesting the potential for microevolution in this variable. However, NST and presented low, nonsignificant *h*2, and NST showed large maternal/common environmental/nonadditive effects (c^2 0.34 ± 0.17). Heritabilities were large and significant ($h^2 > 0.5$) for all growth-related traits (birth mass, growth rate, weaning mass). The only significant genetic correlations we found between a physiological trait and a growth-related trait was between NST and birth mass (r= -0.74; $P < 0.05$). Overall, these results suggest that additive genetic variance is present in several bioenergetic traits, and that genetic correlations could be present between those different kinds of traits.