Correlated responses to a multidirectional artificial selection in the bank vole, *Myodes glareolus*

Pawe⌂Koteja[1], Katarzyna M. Chrząłcik[1] , Geoffrey Dheyongera, Agata Rudolf, and Edyta T. Sadowska[1]

[1] Institute of Environmental Sciences, Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland.

To study correlated evolution of behavioral and metabolic traits we have established an artificial selection experiment, with lines of bank voles selected for high swim-induced aerobic metabolism (A), the ability to maintain body mass on a low-quality herbivorous diet (H), and intensity of predatory behavior towards crickets (P). Four replicate lines are maintained for each of the directions and an unselected control (C). Significant differences between the selected and control lines appeared already after 3 generations of the selection. In generation 11, voles from the selected lines achieved 49% higher maximum rate of oxygen consumption during swimming (means±SD; A: 333±39, C: 223±32mlO2/h), lost 89% less mass in the 4-day test with low-quality diet (mass change; H: -0.15±0.83g, C: -1.42±0.83g), and more than 5 times more frequently attacked crickets (proportion of individuals that attacked and eaten cricket in at least one of two 10-minute tests, P: 75%, C: 14%;). Voles from A lines have a significantly increased basal metabolic rate (BMR A: 65±10, P: 61±9, C: 57±9, H: 61±10 mlO2/h). The result provides a strong support for the □aerobic capacity model□of evolution of endothermy. We also observed differences between the lines in activity level, thermogenic capacity, body temperature, reproductive performance, and body fat content. The selected lines provide a unique model to study cellular, biochemical and molecular factors underlining evolution of the organismal traits.