The effect of fasting on rate of oxygen consumption in air versus water in king penguins, *Aptenodytes patagonicus* A. Fahlman, A. Schmidt, C-A Bost, P.J. Butler, A.J. Woakes and Y. Handrich Centre d'Ecologie et Physiologie Energétiques, C.N.R.S. Strasbourg, France; The University of Birmingham, UK.

Previous data showed that resting rate of oxygen consumption ($\dot{V}_{\rm O_2}$, 1 $\rm O_2$ • min⁻¹) of king penguins during fasting in air decreases with an allometric mass exponent of 2.02 (Fahlman et al., Am J Physiol, in press). We hypothesized that fasting would elicit a similar change in resting \dot{V}_{O_2} of penguins in water. Therefore resting $\dot{V}_{\rm O_2}$ was measured in air and water in ten male king penguins before (Pre, 0-2 days after returning from the sea) and after (Post) an average fasting duration of 14.2 ± 2.3 days (mean ± 1 SD, range 10-19 days) in air and water. The Pre- and Post-fasting body masses were 13.8 ± 1.2 kg and 11.0 ± 0.6 kg (n = 10), respectively. There was no difference in air temperature (P > 0.1, 1-way ANOVA) or in water temperature (P > 0.2, t-test) between experiments and the mean temperatures in air and water were $14.2 \pm 2.3^{\circ}$ C and $8.5 \pm 0.6^{\circ}$ C, respectively. After fasting, the resting $\dot{V}_{\rm O_2}$ was 74% higher in water than in air (air: $86.0 \pm 8.6 \text{ l } \text{O}_2 \cdot \text{min}^{-1}$; water: $149.5 \pm 40.7 \text{ l } \text{O}_2 \cdot \text{min}^{-1}$, P <0.01, Mann-Whitney), which is similar to other studies (Culik et al., 1996, J. Exp. Biol. 199: 973-983). However, after returning from the sea, there was no difference in resting $\dot{V}_{\rm O_2}$ between air and water (air: 117.7 \pm 19.3 ml $O_2 \cdot min^{-1}$ water: 122.2 ± 27.3 ml $O_2 \cdot min^{-1}$, P > 0.6, t-test). Thus it is important that calibration and validation studies of the \dot{V}_{O_2} and heart rate relationship with king penguins in water are performed on fully-fed birds and also, that recovery from fasting during re-feeding is taken into account. (Support: NERC NER/A/S/200001074; IPEV Programme 394).