Fasting affects foraging costs in Steller sea lions

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Conclusions

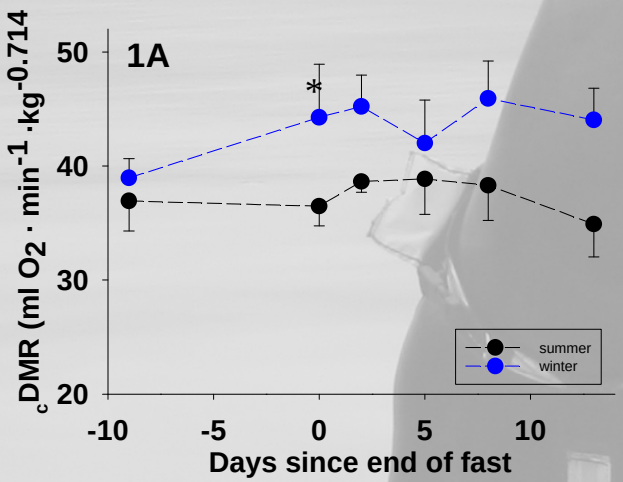
DMR increased after fast, especially in the winter, suggesting an increase in convective heat loss when diving. During a 14 day recovery, available foraging time decreased with 18% in the winter and 5% in the summer.

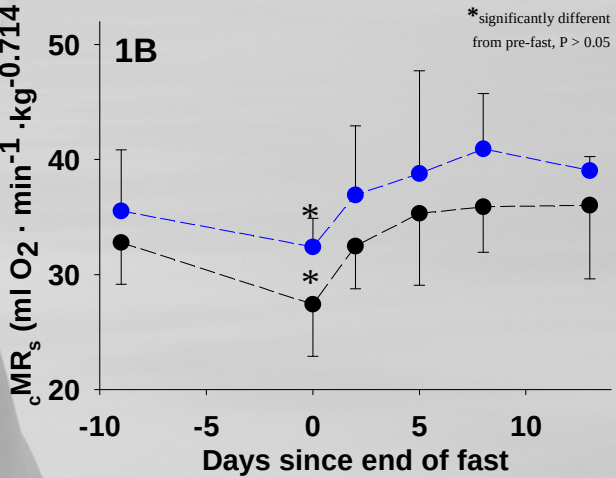
Objectives

Assess how periods of fasting (summer vs. winter) affect the metabolic cost of foraging in Steller sea lions *(Eumetopias jubatus)*, by measuring changes in diving (DMR) and surface (MR_s) metabolic rates.

Background

Female Steller sea lions fast for ~8–10 days following the birth of their pups. Periods of fasting can also occur due to food shortage.





Methods

- 3 trained female Steller sea lions
- DMR and MR_s were measured using flow through respirometry, before and after a 9-10 day fast and during a 14 day recovery
- summer vs. winter; dive depth; 10-50 m
- Trials: ~6 min pre-dive rest followed by 4-6 dives, with a ~6 min recovery between dives
- Analysis: mass corrected metabolic rate ($_cDMR$, $_cMR_s$; $VO_2/kg^{-0.714}$)

Results

Directly after fast:

$_cDMR$ summer: no change

winter: +13.5 %* (Fig 1A)

$_cMR_s$ summer: -16.4 %*

winter: -8.0 %* (Fig 1B)

14 day recovery:

The increase in $_cDMR$ after fast resulted in a -18 % decrease in foraging time in the winter and -5 % in the summer.

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