

Investigating Stock Differences in Nutritional Metabolites of young Steller Sea Lion pups in Southeast Alaska, Western Alaska and Russia

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The decline of the western stock of Steller sea lions (*Eumetopias jubatus*) since the 1970 s prompted seasonal monitoring of health indices to assess nutritional stress using blood metabolites known to change predictably when animals are food deprived. Here comparisons of blood metabolites were used to determine if young Steller sea lion pups (SSLs) (< 2 mo) had blood chemistry profiles indicative of fasting or starvation. Blood samples were collected from pups at rookeries in the west (Aleutian Islands, Gulf of Alaska, Prince William Sound) (W), southeast Alaska (SE) (n=629), and Russia (R) (n=512). Plasma blood urea nitrogen (BUN) and ketone bodies (b-HBA) were measured spectrophotometrically and used to assess whether pups fasted longer than the normal (1 - 2 days) foraging bouts of lactating adult females. BUN plasma concentrations in SE were higher than W and R (SE: $5.55 \text{ mM} \pm 1.82$, n=249, (range: 2.37-11.31 mM); W: $5.1 \text{ mM} \pm 1.99$, n=383, (range: 1.51 - 13.44 mM); R: $5.12 \pm 1.87 \text{ mM}$, n=491, (range: 1.70 - 12.70 mM); p = 0.006). These values are similar to those of same aged SSLs fasted for 2.5 days ($4.8 \text{ mM} \pm 0.5$) during a controlled fasting study (Rea et al., 2000). The majority of sites from all regions had less than 35% of all samples with b-HBA concentrations ([b-HBA]) above 0.3mM, the threshold concentration indicative of fasting in SSLs. Pups with [b-HBA] above fasting threshold had accompanying low [BUN] indicative of adaptive, short-term fasting rather than Phase III fasting or starvation. The proportion of pups that exhibited b-HBA fasting threshold concentrations was higher in SE than in W or the R (p=0.00). Plasma [b-HBA] in SE were higher than W but similar to the R (SE: $0.239 \text{ mM} \pm 0.172$, n=251 (range: 0.040 - 1.088 mM); W: $0.206 \text{ mM} \pm 0.131$, n=382 (range: 0.00 - 0.853 mM); R: $0.219 \pm 0.172 \text{ mM}$, n=498 (range: 0.00 - 1.270 mM); p = 0.041). Higher plasma BUN and b-HBA concentrations in Southeast Alaska may suggest differences in fasting behavior among pups from Southeast Alaska, compared to western Alaska or Russia.

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