

**Got milk? Assembling physiological indices of weaning for Steller sea lions**

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It is difficult to define weaning in sea lions, and even more difficult to determine when and how it occurs. Our approach with Steller sea lions (SSL) has been to assemble a number of physiological indices that each contribute to our understanding of how a young animal is making its living; whether individuals are ingesting milk, ingesting living prey, or both at the time of capture and when and how abruptly this nutritional transition occurs. Presence of milk in the stomach provides positive identification of nursing animals (n=75). Presence of particular parasites which require a fish intermediary host imply at least minimal prey ingestion. High blubber or serum levels of specific fatty acids which are typically underrepresented in milk production identify young sea lions which are ingesting prey high in these fatty acids (n=477). Changes in the levels of stable isotopes of carbon and nitrogen deposited in the vibrissae indicate that a diet lower in trophic signature than milk has been ingested, in addition to or replacing the milk diet (n=87). In juvenile SSL peak nursing  $^{15}\text{N}$  values (20.0 +/- 0.1‰) were followed by decreases of 2.3 to 5.0‰ towards the root, suggesting a dietary switch. Each of these indices by itself cannot discretely identify the source of nutrition (milk, prey or both), but in combination can be used with other biochemical markers and behavioral observations to build a case identifying where each individual is along the continuum to nutritional independence.



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