

Investigation in Blood and Muscle Development in the Steller Sea Lion (*Eumetopias jubatus*): Implications for Diving and Foraging Ability

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Increased oxygen stores significantly enhance the amount of time that marine mammals can maintain aerobic metabolism while diving. For a given foraging depth, greater breathhold ability improves foraging efficiency; therefore understanding the development of oxygen stores in juvenile marine mammals should improve our ability to interpret behavioral patterns in newly weaned individuals. To examine the development of diving ability in Steller sea lions we monitored changes in blood and muscle oxygen stores by measuring hematocrit (Hct), hemoglobin (Hb), red blood cell counts (RBC) in juveniles 1–24 months of age (n=79), and muscle myoglobin (Mb) concentrations in 1 month old pups (n=9). Blood samples were taken from animals captured by Alaska Department of Fish and Game (ADF&G), and muscle samples were taken from recently deceased pups found on rookeries in Southeast Alaska. Hct, Hb, and RBC values increase with age until they reach a plateau around 10 months. Muscle myoglobin loads in 1 month old pups are significantly lower than that of adults ($p < 0.001$). Additionally pups show no variation in concentration of Mb between swimming and non-swimming muscles ($p > 0.05$) whereas adults show significant elevation in Mb concentration in swimming muscles. Lower Hct, Hb, RBC, and Mb values indicate decreased oxygen storage capacity in nursing animals when compared to adults. These findings suggest that young of the year are physiologically limited in their foraging ability. Ongoing investigations into the diving behavior of juvenile sea lions show that average dive depth and duration increases at around one year of age, and further supports our hypothesis that physiological status influences behavioral patterns. This research is supported through a grant provided by CIFAR (NA17RJ1224) and with a co-operative agreement through NOAA and ADF&G (NA17FX1079).



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