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### **Molting Strategies and Seasonal Energetic Requirements of Spotted, Ringed, and Bearded Seals**

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Spotted (*Phoca largha*), ringed (*Pusa hispida*), and bearded (*Erignathus barbatus*) seals use sea ice as a substrate for various critical functions, including rest, giving birth, nursing, and predator avoidance. They also rely on sea ice during the annual molt, when they shed several layers of epidermis and fur and regenerate a new coat. To facilitate this process, seals haul out for extended periods, increase blood flow to the skin, and maintain elevated skin temperatures. Molting is assumed to have a significant metabolic cost, which would increase if appropriate haul-out substrate were unavailable; however, the energetic consequences of molt have only been quantified for a few species. Working with trained spotted (n=4), ringed (n=4), and bearded (n=2) seals, we tracked changes in coat condition and seasonal energetic demands to identify key periods when the loss of sea ice may have the greatest impact. We documented the timing, progression, and duration of the visible molt for all seals. In addition, we used open-flow respirometry to track fine-scale changes in the resting metabolic rate (RMR) of six seals for a minimum of one year. We observed clear patterns in seasonal costs that related to the distinct molting strategies of each species. For species that molted over a relatively short interval (spotted:  $36 \pm 4.6$  days, ringed:  $29 \pm 2.5$  days), individual RMR increased on average 26-47% during the molting period. In contrast, molting over a longer interval (bearded:  $107 \pm 14.8$  days) appeared to limit the metabolic cost of molting as indicated by a stable annual RMR. These findings reveal the relationship between molting strategy and seasonal energetic requirements and provide quantitative data that can be used to assess species-specific vulnerabilities to changing environmental conditions.