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Species-Specific Characteristics Influence Contaminant Accumulation Trajectories and Signatures Across Ontogeny in Three Pelagic Shark Species

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ABSTRACT

Factors influencing organic contaminant accumulation in sharks, especially across ontogeny, are not well-known. Contaminant concentrations were measured in three species of sharks (Blue, Shortfin Mako, and Common Thresher) across a range of size classes (neonatal to adult) that vary in their ecological and physiological characteristics. Empirical data was compared to a theoretical framework that predicted the shape of lifetime accumulation curves. We found that a one-size-fits-all accumulation model was not appropriate as species-specific characteristics had a significant effect on contaminant accumulation trajectories. Maternal offloading likely has an important effect on determining neonatal shark contaminant starting points, and trophic ecology and physiology may interact to affect the shape of species' contaminant accumulation curves. Makos were found to have the highest accumulation potential and Blues the lowest, with Threshers being intermediate in accumulation potential. Changes in species' ecology and/or physiology were also reflected in contaminant signature changes over ontogeny. If contaminant concentrations are to be used as a proxy for risk, species-specific characteristics need to be taken into account when estimating contaminant exposure and its potential negative effects on shark health and human consumption safety.