Comparing inner ear morphologies of globicephaline (Odontoceti: Delphinidae: Globicephalinae) dolphins

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A growing body of evidence indicates that increasing levels of human-produced (‘anthropogenic’) noise in the oceans is having a variety of negative impacts on marine mammals. Establishing the hearing ranges of marine mammals is therefore a crucial part of their monitoring and conservation, and can also help shed light on their ecology, physiology, and evolutionary relationships. Here, we use a combination of morphological data from inner ear labyrinths and existing audiogram data to establish morphological proxies for hearing ranges in globicephaline dolphins. Globicephalinae are a clade nested within Delphinidae that are identifiable by their dark coloration, rounded melon- shaped heads, short snouts, and small numbers of teeth. Audiogram data of hearing frequency ranges for many species within this groupare available, making them ideal for producing robust correlations between auditory physiology and morphological measurements. We used a computed tomography (CT) scanner to scan a comprehensive sample covering all globicephaline species. SPIERS and VGStudioMax software were used to extract 3D models of the inner ear labyrinths. Standard measurements and landmarks for ordination were obtained to compare with current audiogram data. Our preliminary analysis shows variation among the inner ear labyrinths. *Globicephala melas* has a broader cochlear width and lower frequency sound sensitivity compared with *Globicephala macrorhynchus*, its sister taxon,which has a higher frequency range of hearing sensitivity. *Peponocephala electra* appears to have higher frequency hearing sensitivity. With further investigation, these data will help us gain a fuller understanding of hearing frequencies among extant odontocetes.