ROLE OF ADIPOSE TISSUE RESPONSIBLE FOR ECHOLOCATION IN THE BIOACCUMULATION PROCESS OF LIPOPHILIC COMPOUNDS IN HARBOUR PORPOISES

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Previous studies have suggested that pollution can lead to adverse effects in marine mammals, thereby causing illnesses. For conservation purposes, it is therefore useful to follow up on the pollution status of these animals. Since harbour porpoises (*Phocoena phocoena*) are top predators with relatively long life spans and considerable lipid deposits and key species in several marine ecosystems in the northern hemisphere, investigating chemical pollution with an emphasis on lipophilic POPs is worthwhile. In the present study, physiologically based toxicokinetic (PBTK) models for PCB 153 and PBDE 153 in male harbour porpoises were constructed in order to 1) gain a better understanding of uptake, distribution and elimination of two lipophilic POPs with a similar molecular structure in liver, kidney, muscle, brain, fat, melon and mandibular fat of harbour porpoises, and 2) compare bioaccumulation of lipophilic compounds in lipid-rich tissues with different lipid composition and purpose (echolocation versus insulation). The numerical models were programmed and developed in Berkeley Madonna software as well as in Python and validated by using results analysed by GC-MS in tissue samples of harbour porpoises originating from the southern North Sea. Physiological and biochemical parameters were obtained from the literature. In the model, the predominant intake of lipophilic pollutants was via milk in the first eight months after birth and after weaning, a fish diet was set as the main food source. Overall, the models for male harbour porpoises reveal that despite differences in lipid composition and lipid types, lipophilic pollutants bioaccumulate similarly in blubber, mandibular fat and melon with increasing age. Nevertheless, the model shows the highest levels of PCB 153 is found in mandibular fat, followed by melon and blubber. From these results, mandibular fat can be considered as a sink for lipophilic compounds and a better proxy for lifetime exposure than blubber which can be both a sink and source of lipophilic pollutants.