

Relationship between mercury and selenium concentrations in marine fishes and odontocetes

Jessica Dutton, Ph.D.

Mercury (Hg) is a pervasive global pollutant that bioaccumulates in organisms and biomagnifies in marine food webs so top predators including fishes (e.g., sharks, tunas, king mackerel, golden tilefish, blue marlin) and odontocetes (toothed whales) have the highest body burden. The main source of Hg exposure to humans is through seafood consumption and can result in deleterious health effects. Currently, federal and state Hg advisories regarding fish consumption are issued based on the concentration of Hg in muscle tissue; however, selenium (Se), an essential element, has an antagonistic relationship with Hg. Previous studies have argued that if Se is present in molar excess (i.e., the Se:Hg molar ratio is $> 1:1$), then Se may have a protective effect against Hg toxicity and should therefore be used as a seafood safety criterion in risk assessments. To understand the relationship between Hg and Se concentrations in teleosts, sharks, and odontocetes, my research group has undertaken several studies throughout the northern Gulf of Mexico and in St. Vincent and the Grenadines, West Indies. This seminar will discuss Hg and Se concentrations, and Se:Hg molar ratios in offshore predatory fishes (e.g., king mackerel, tunas, dolphinfish), sharks (e.g., bull shark), and odontocetes (e.g., bottlenose dolphin, killer whale) in relation to biological variables (body length, trophic position, and maternal transfer). The findings will be used to determine whether species can tolerate high Hg tissue concentrations because they have at least an equimolar concentration of Se and whether Se:Hg molar ratios should be used as a seafood safety criterion in risk assessments.