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Accumulation and cytosolic partitioning of metals in the American oyster *Crassostrea virginica*

D.W. Engel

National Marine Fisheries Service, NOAA, Southeast Fisheries Science Center, Beaufort Laboratory, 101 Pivers Island Road, Beaufort, North Carolina 28516, USA

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Abstract

The ability of the oyster to accumulate trace metals, particularly the transition metals (Cd, Cu, Zn, and Hg), from food and water has been well documented. There is little information, however, on how these metals interact to affect whole animal retention, partitioning, and binding to metallothionein (Mt). In this study oysters were exposed to Cd and Cu, both alone and in combination, and significant effects have been demonstrated on subcellular partitioning. These studies showed that Cu can displace Cd from Mt, but the Cd is not lost from the animal. Two metal-binding protein peaks have been separated by gel chromatography (< 10 K and 24 K daltons). The lower molecular weight protein peak has been characterized as Mt, consisting of two isoproteins, but the higher molecular weight protein peak appears to be an aggregation of metal-binding proteins, some of which may be Mt or a Mt dimer. In environments that are contaminated with trace metals, Mt binds primarily Hg, Cu, and/or Cd and Zn, but in noncontaminated areas Mt binds primarily Zn on one of the two isoMts.

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