

Parasites Modify Sub-Cellular Partitioning of Metals in the Gut of Fish

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Abstract

Infestation of fish by parasites may influence metal accumulation patterns in the host. However, the subcellular mechanisms of these processes have rarely been studied. Therefore, this study determined how a cyprinid fish (*Rastrineobola argentea*) partitioned four metals (Cd, Cr, Zn and Cu) in the subcellular fractions of the gut in presence of an endoparasite (*Ligula intestinalis*). The fish were sampled along four sites in Lake Victoria, Kenya differing in metal contamination. Accumulation of Cd, Cr and Zn was higher in the whole body and in the gut of parasitized fish compared to non-parasitized fish, while Cu was depleted in parasitized fish. Generally, for both non-parasitized and parasitized fish, Cd, Cr and Zn partitioned in the cytosolic fractions and Cu in the particulate fraction. Metal concentrations in organelles within the particulate fractions of the non-parasitized fish were statistically similar except for Cd in the lysosome, while in the parasitized fish, Cd, Cr and Zn were accumulated more by the lysosome and microsomes. In the cytosolic fractions, the non-parasitized fish accumulated Cd, Cr and Zn in the heat stable proteins (HSP), while in the parasitized fish the metals were accumulated in the heat denatured proteins (HDP). On the contrary, Cu accumulated in the HSP in parasitized fish. The present study revealed specific binding of metals to potentially sensitive sub-cellular fractions in fish in the presence of parasites, suggesting interference with metal detoxification, and potentially affecting the health status of fish hosts in Lake Victoria.

Keywords

Parasites, Sub-Cellular, Gut of Fish