The effects of heavy metals on the physiology of symbionts bearing benthic foraminifera

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Heavy metals are excessively indroduced into coastal environments due to anthropogenic activities. Evaluation of the consequences of excess dissolved heavy metal concentrations in seawater is needed in order to assess the water quality. Among the heavy metals, exposure to acute concentrations of Cu, Cd and Pb is known to be toxic and can cause dysfunction and mortality among marine organisms. Foraminifera, a unicellular micro-organism with great abundance and distribution in the oceans incorporates the metals into their shell via a mechanism of direct seawater vacuolization and therefore, reflects the chemical composition of the ambient seawater. This research aims to evaluate the physiological effects of different symbiont bearing large benthic foraminifera (LBF) species to chronic exposure of Cu, Cd and Pb in order to establish their application as tools for heavy metals marine monitoring. Two main factors which affect the partition coefficient of the metals in the shells are the different biomineralization mechanisms of the foraminifera and their endosymbionts. We chose to study LBF species which are common in the Israeli coastline and have global distribution and different endosymbionts and biomineralization mechanisms. Specimens were cultured under different dissolved concentrations of the metals for several weeks. The physiological response of the holobiont was evaluated based on measurements of chlorophyll *a*, dissolved O_2, weight and growth. Preliminary results indicate that concentrations of acute-X5 of Cu, Cd and Pb had no impact on either growth and algal activity in all species indicating that LBF can be used as an ideal tool for heavy metals marine monitoring.