Abstract

Cadmium is one of the widely used heavy metals (HM) in commercial and industrial products and contributes to environmental contamination in an urban setting. In our previous studies, we established that *An. gambiae sensu stricto*, a vector of malaria, had adapted to HM pollutants in nature despite their proclivity for unpolluted aquatic habitats. We further demonstrated that heavy metal tolerance adaptation process impacts a biological cost to the fitness of the mosquito and potentially involves the induction of specific HM-responsive transcripts and proteins. Here we interrogated differential proteomic profiles of the cadmium tolerant vs. naïve strains of *An. gambiae* to shed light on proteomic processes that underpinned biological cost to fitness. We identified a total of 1067 larval proteins and observed significant down-regulation of proteins involved in larval immune responses, energy metabolism, antioxidant enzymes, protein synthesis, and proton transport. Our results suggest that mosquitoes can adjust their biological program through proteome changes to counter HM pollution. Since our study was done in controlled laboratory settings, we acknowledge this may not wholly represent the conditions HM polluted environments. Nevertheless, mosquitoes deploying this strategy have the potential of creating an urban enclave for breeding and thrive and become agents of sporadic malaria epidemics.