
Pollution exposure amplifies the effects of predation risk on cell-mediated immune response in a passerine species

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Abstract

Immune systems have evolved to counteract the negative impacts of pathogens on host fitness. However, mounting immune responses is costly, and may be traded-off against resource allocation to other fitness-related functions. In this study, we used the Hybrid sparrow (*Passer domesticus* x *hispaniolensis*) to experimentally explore how cell mediated immune response (CMI) might vary according to the levels of experienced predation risk and prior exposure to metallic pollution. To do so, we captured a sample of sparrows in the surroundings of Gabès–Ghannouche factory complex of phosphate treatment (high exposure to metallic pollution) and another sample in a less polluted site, situated 12 km to the north (low exposure to metallic pollution). Each sample was divided into two subsamples that have been exposed to either a cat (high predation risk) or a rabbit (no predation risk). Subsequently, we assessed the intensity of CMI in each sampled sparrow, using the Phytohaemagglutinine (PHA) test. Generalized Linear Mixed Models (GLMM) were then conducted to investigate CMI as a function of exposure to pollution (two classes), predation risk (two classes) and their interaction. We found that the intensity of exposure to pollution and the level of perceived predation risk had interactive effects on the amplitude of CMI. Sparrows from the less polluted site showed overall higher levels of CMI compared with those from the polluted site. More interestingly, CMI intensity decreased with increasing predation risk in sparrows from the less polluted, while no significant change was recorded in those from the less polluted site. These results suggest that predation risk induced a reduced allocation priority of resources in immune function, which might be in turn weakened by the previous long term exposure of the prey to metallic pollution. Further investigations including additional measures of immune function are needed for better understanding of this issue.

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