

A first insight into stress-induced neuroendocrine and immune changes in the octopus



A number of cephalopod species present substantial ecological and economical importance; however, data on the physiology of stress and on regulatory processes linking stress to immune defence against pathogens remain extremely scarce in these organisms. The present study examined the influence of a 5 min air exposure, a common perturbation associated with handling in aquaculture settings and fisheries, on neuroendocrine and immune parameters in the octopus *Eledone cirrhosa*. Measurements of circulating concentrations of noradrenaline and dopamine, two hormones that are released in the haemolymph during stress in bivalves and gastropods, showed that the 5 min air exposure represents a real stress to octopus. Indeed, blood levels of both hormones increased by about 2–2.5-fold in stressed animals. Concomitantly, a significant decrease in the number of circulating haemocytes was observed, whereas haemocyte phagocytotic activity and superoxide anion production increased transiently between 5 and 60 min after the beginning of the stress. These results provide a first insight into the effects of stress on

catecholamine levels and immune functions in cephalopods and suggest that stress and immunity may be associated in these organisms.

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Obtenir le document : EDP Sciences

Mots clés : Haemolymph, Catecholamine, Immunity, Cephalopods

Date : 2002-06-15

Format : text/xml

Source : [https://doi.org/10.1016/S0990-7440\(02\)01173-7](https://doi.org/10.1016/S0990-7440(02)01173-7)

Langue : Anglais

Télécharger les documents : [https://www.alr-journal.org/10.1016/S0990-7440\(02\)01173-7/pdf](https://www.alr-journal.org/10.1016/S0990-7440(02)01173-7/pdf)

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