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Diatom bloom-derived biotoxins cause aberrant development and gene expression in the appendicularian chordate *Oikopleura dioica*

Nuria P. Torres-Águila[1], Josep Martí-Solans[1], Alfonso Ferrández-Roldán[1], Alba Almazán[1], Vittoria Roncalli[1], Salvatore D'Aniello[2], Giovanna Romano[3], Anna Palumbo[2], Ricard Albalat[1] & Cristian Cañestro[1]

Investigating environmental hazards than could affect appendicularians is of prime ecological interest because they are among the most abundant components of the mesozooplankton. This work shows that embryo development of the appendicularian *Oikopleura dioica* is compromised by diatom bloom-derived biotoxins, even at concentrations in the same range as those measured after blooms. Developmental gene expression analysis of biotoxin-treated embryos uncovers an aberrant golf ball-like phenotype affecting morphogenesis, midline convergence, and tail elongation. Biotoxins induce a rapid upregulation of defensome genes, and considerable delay and silencing of zygotic transcription of developmental genes. Upon a possible future intensification of blooms associated with ocean warming and acidification, our work puts an alert on the potential impact that an increase of biotoxins may have on marine food webs, and points to defensome genes as molecular biosensors that marine ecologists could use to monitor the genetic stress of natural populations exposed to microalgal blooms.

[1] Departament de Genètica, Microbiologia i Estadística and Institut de Recerca de la Biodiversitat (IRBio), Facultat de Biologia, Universitat de Barcelona. Av. Diagonal 643, 08028 Barcelona, Catalonia, Spain. [2] Department of Biology and Evolution of Marine Organisms, Stazione Zoologica Anton Dohrn, Villa Comunale 80121, Napoli, Italy. [3] Department of Integrative Marine Ecology, Stazione Zoologica Anton Dohrn, Villa Comunale, 80121 Napoli, Italy. Correspondence and requests for materials should be addressed to R.A. (email: ralbalat@ub.edu) or to C.C. (email: canestro@ub.edu)