Investigating new marine environment-friendly antifouling molecules using a new primary cell culture model of Ruditapes philippinarum hemocytes

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Abstract

The screening of new marine environment-friendly antifouling molecules represents an important biotechnological challenge. Bio-activities are usually carried out on whole marine organisms. However, to decrypt the mechanisms of action of these molecules and to help classify molecules, the cellular model is largely more suitable. As bivalves are excellent sentinels of the marine environment, and as hemocytes are involved in survival and many physiological functions, we developed a primary immune cell culture model as well as a toolbox of cellular assays for *in vitro* acute and sub-chronic ecotoxicity assessments. Our results showed that viable and functional *R. philippinarum* hemocytes are maintained in culture for at least 15 days in which our conditions enabled to maintain a diversity of morphotypes. Finally, a cytotoxicity screening of sponge extracts with a potential antifouling effect revealed the potential of our model for marine ecotoxicological analyses. Interestingly, our results showed different cytotoxicity and effect profiles with time- and dose-dependent responses, suggesting diverse molecular responses. In conclusion, it appears that this model could be very relevant to explore the mechanisms of action of new antifoulings, at cellular level. This *in vitro* model also represents an attractive investigating tool providing insights into the effect of diverse marine pollutants, in single or mixture conditions, or climate change on marine bivalves, and host-microbiota interactions.

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