

Exploring mode of action and immunomodulating effects of marine toxins using in vitro human cell line models

Dewulf Friedel, Renquet Oliver and Asselman Jana

Blue Growth Research Lab, Ghent University, Ostend Science Park, Wetenschapspark 1, 8400 Oostende, Belgium

E-mail: friedel.dewulf@ugent.be

Marine toxins are a diverse group of natural toxins produced by marine micro-algae. They occur in high amounts during harmful algal blooms and cause human intoxications by consumption of contaminated shellfish. Moreover, marine toxins also end up in sea spray aerosols, causing an inhalational exposure route associated with several effects including respiratory symptoms. High concentrations of these natural molecules are linked with shellfish poisoning. However, low concentrations have been associated with health-promoting effects, such as anti- Alzheimer, anti-inflammatory or anti-cancer properties. We investigated the human health effects of marine biotoxin exposure by in vitro (immuno)toxicity testing. A sub selection of marine toxins with high potential were selected, namely yessotoxin and homoyessotoxin. Two human cell line models, A549 and THP-1, were exposed to different concentrations of the phycotoxins. Various types of colorimetric and fluorescent assays provided insights into the mode of action and immune-modulating effects of the phycotoxins. At low doses, both yessotoxin and homoyessotoxin selectively impact lysosomes, preserving metabolic activity and cell membrane integrity. Furthermore, they exhibit a concentration-dependent modulation of cytokine expression.

Keywords

Marine Toxins; In Vitro (immuno)toxicity