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Application of the Receptor Binding Assay for the evaluation of Ciguatera risk in French Polynesia

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In French Polynesia, the estimated incidence of Ciguatera Fish Poisoning (CFP) in 2007 was 2.2 cases/1.000 inhabitants. Despite significant under-reporting of CFP cases, good epidemiological data remain essential to help identify areas of potential interest for monitoring programs. Moreover, even if local fishermen are generally aware of localities or of fish species with high CFP-risk, the development of local fisheries is strongly impeded and exportation of fish products remains very risky. Since 2004, the Louis Malardé Institute has engaged in large-scale risk assessment programs in various islands of French Polynesia (Moruroa, Fakarava, Tubuai, Raivave, Nuku-Hiva) to help reduce CFP risk for local populations. Before going to the field, safe and risky areas as well as fish species of a given island are selected with the help of a questionnaire send to the local population and fishermen. Then, the monitoring of both Gambierdiscus populations (the causative agent) and fish species from various trophic levels is performed which is the best strategy to evaluate the toxicity status of a lagoon. In the process, the receptor binding assay (RBA) proved to be a valuable, suitable and sensitive tool for detecting ciguatoxins in all stages of the trophic chain of ciguatera, as our findings regarding potentially toxic areas and fish were consistent with the knowledge of local populations. The potential application of RBA for new biological matrix, i.e., marine cyanobacteria recently identified as potential CFP-toxins producers with transfer of toxins to giant clams, will also be discussed. But, managing CFP risk is a very complex issue due to the absence of an international reference assay, a clear clinically effective dose harmful to human and international or local legislations.

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