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LETTER TO THE EDITOR

Letter to the Editor regarding "Collaborative study for the detection of toxic compounds in shellfish extracts using cell-based assays. Part I: screening strategy and pre-validation study with lipophilic marine toxins" and "Part II: application to shellfish extracts spiked with lipophilic marine toxins."

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Dear Sir,

The articles reporting the detection of toxic compounds in shellfish extracts using cell-based assays [1, 2] raise significant concerns, because the procedure is based on measurement of unqualified cytotoxicity, which is a fully unspecific parameter. The severity of this limitation in these studies is particularly relevant, because unfractionated shellfish extracts were analyzed, and these include an undetermined number of different compounds, whose biological effects stem from the activity of each component in the mixture and possible cross-talk between mechanisms of action.

Those investigations were set up to study unexplained shellfish toxicity in Arcachon Bay, but the materials used in the studies were obtained from other areas and extracts were spiked with known toxins [1, 2]. Proof that a simple cytotoxicity assay is reliable to detect not-yet-known toxins was not given.

Unfractionated shellfish extracts are cytotoxic at low concentrations [2, 3], and extreme variability of readouts is found, depending on the molecular/functional parameters used for analysis [3]. Thus, a simple cytotoxicity assay to detect new toxic agents may yield false positives. Anything can become toxic, as toxicity is a matter of dose. Results of cytotoxicity assays should be interpreted with caution if they do not include functionally qualified alterations and biomarkers [4, 5].

The development of alternatives to animal testing for the detection of marine biotoxins might not be granted by the use of nonspecific parameters, such as unqualified cytotoxicity, and procedures based on mechanistic knowledge are to be preferred in bioanalytical settings [5]. Owing to the lack of toxicological information of simple cytotoxicity assays, their use may actually lead to an increased use of animals to substantiate conclusions. Toxicity testing demands the development of suites of specific, mechanistic-based cellular assays [6], which could then represent reliable alternatives to animal-based assays.

A response to this "Letter to the Editor" can be found at DOI:10.1007/s00216-012-6228-8

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