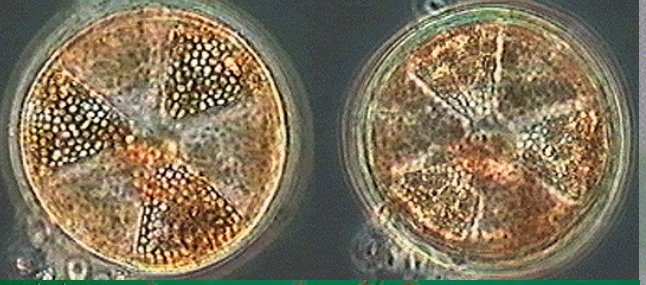
Gian Paolo Rossini

Università di Modena e Reggio Emilia - Italy

Functional assays for the detection of toxins in food

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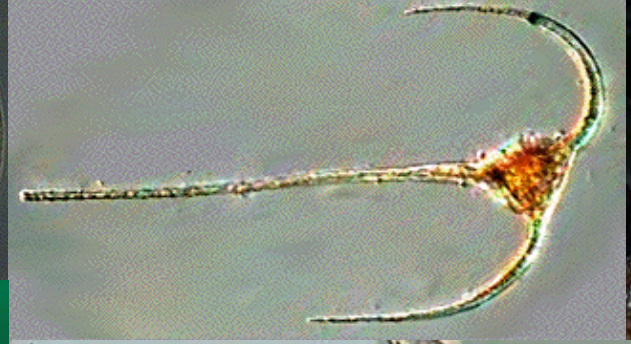
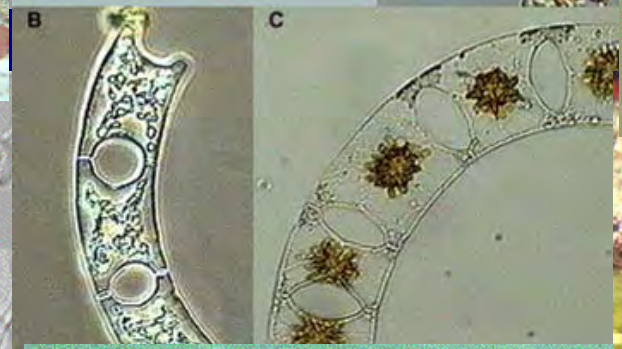
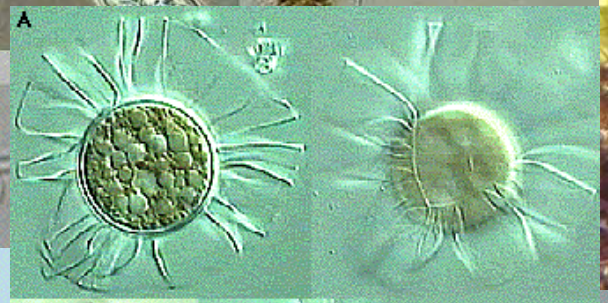
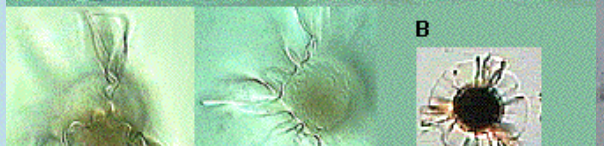



A


B
C


A


A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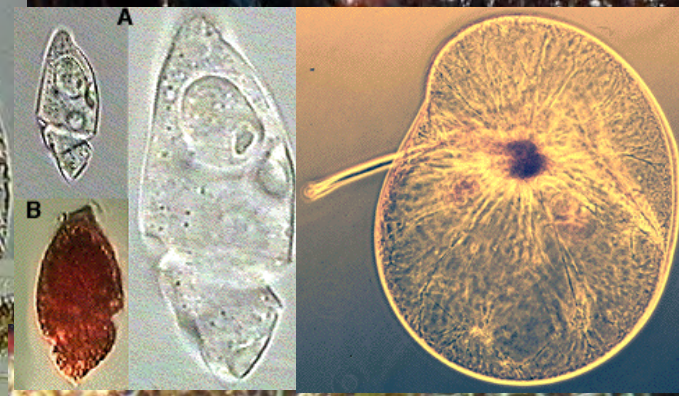
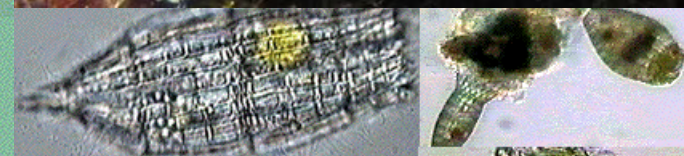
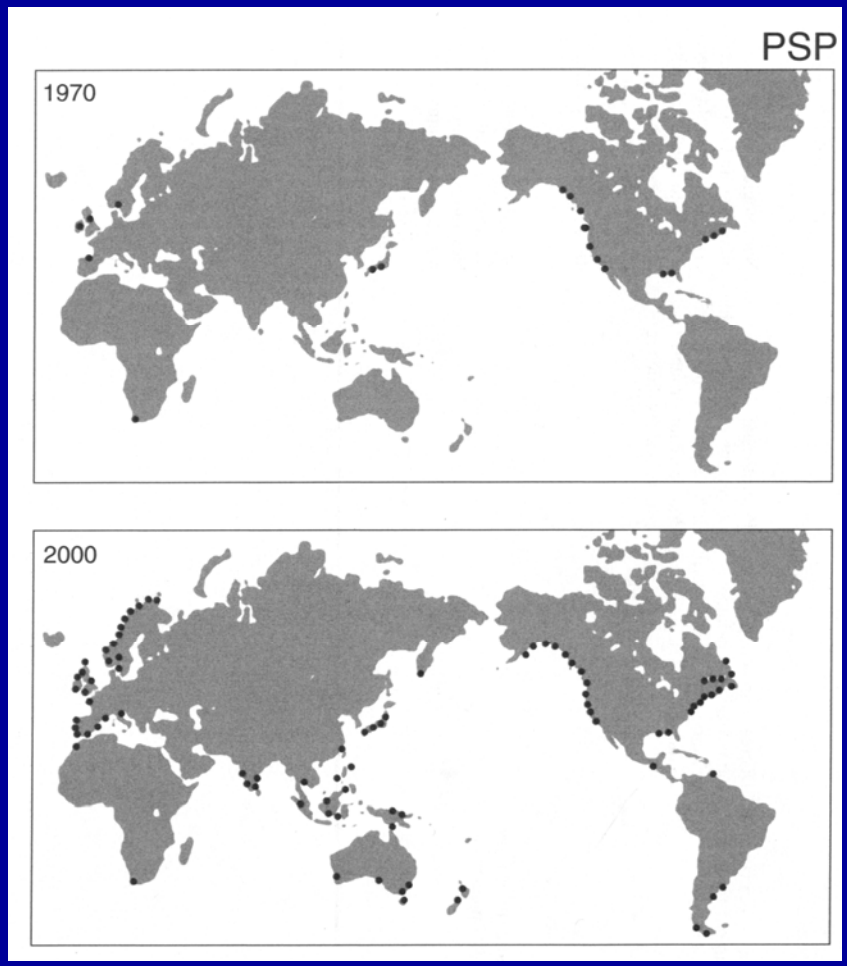
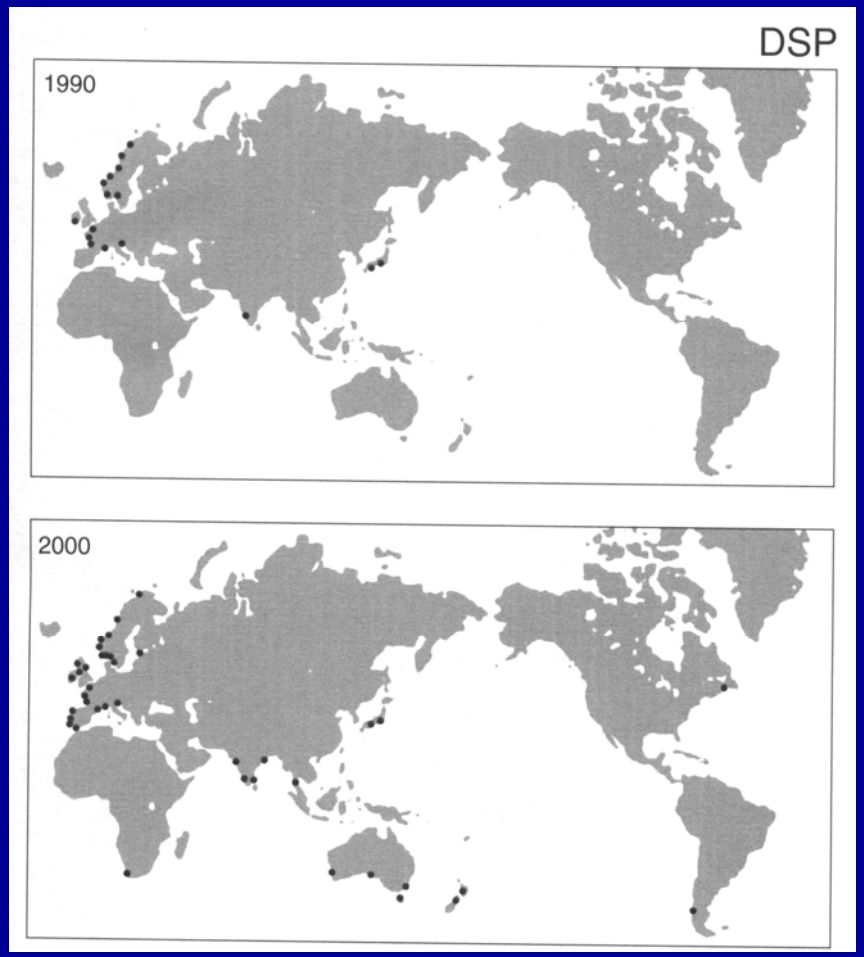

A
B

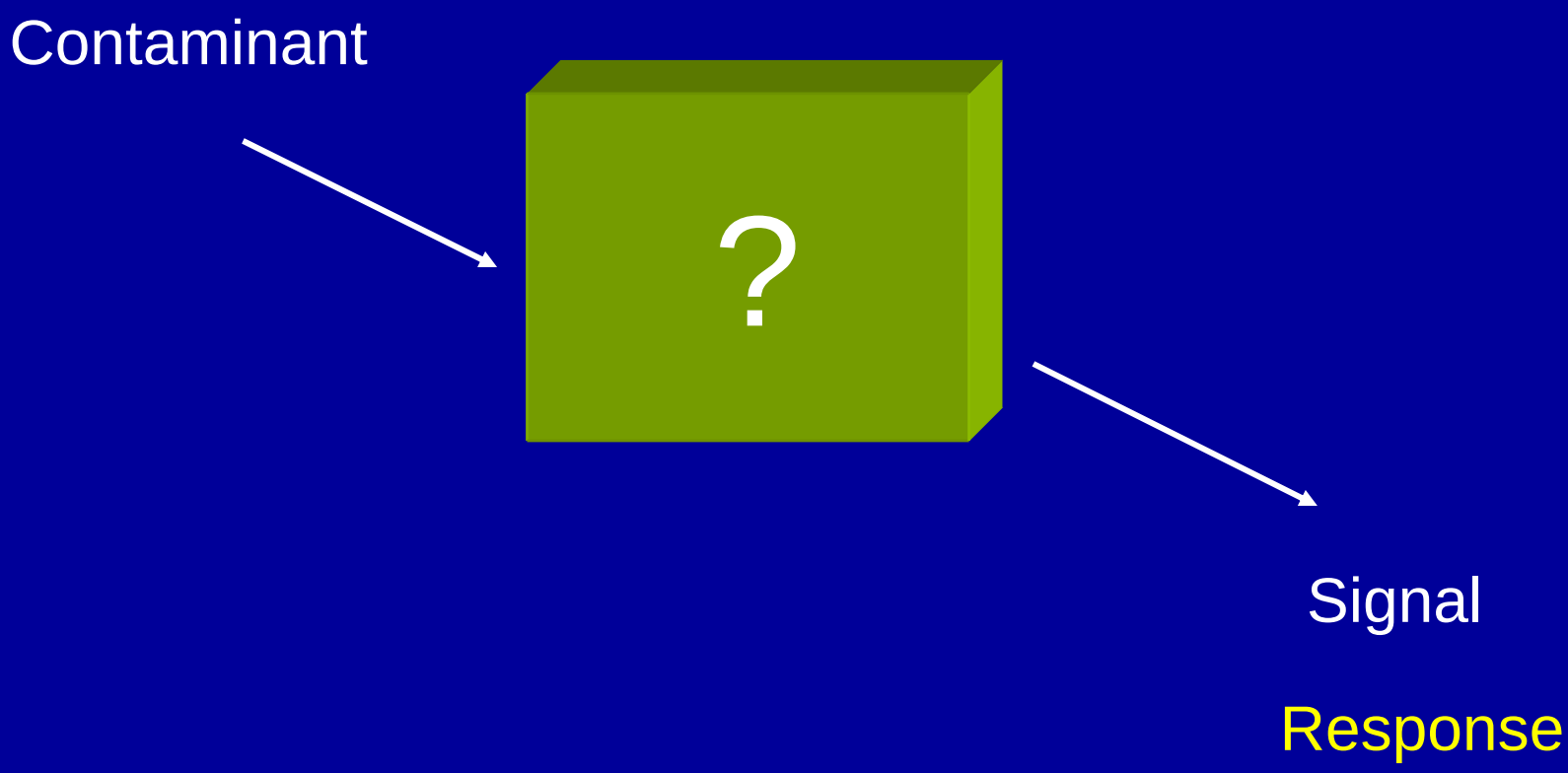


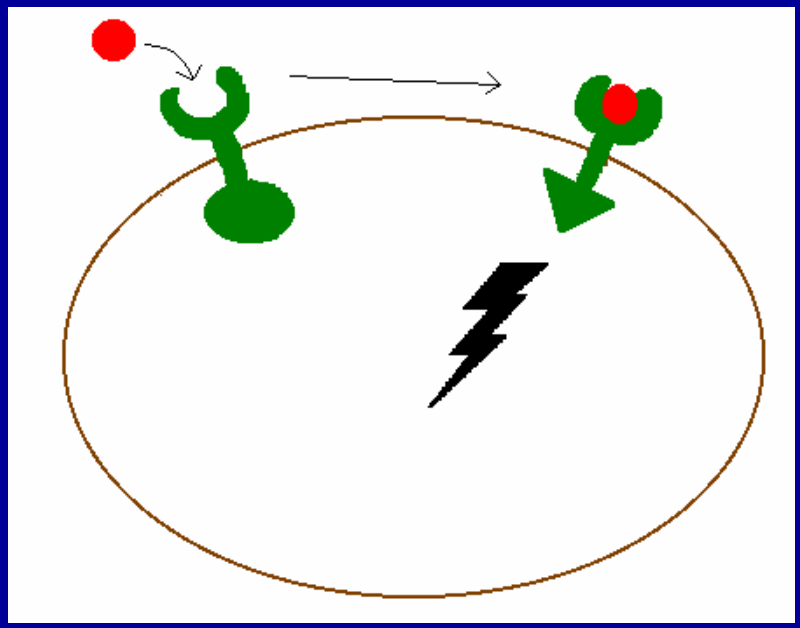

PSP
1970
2000

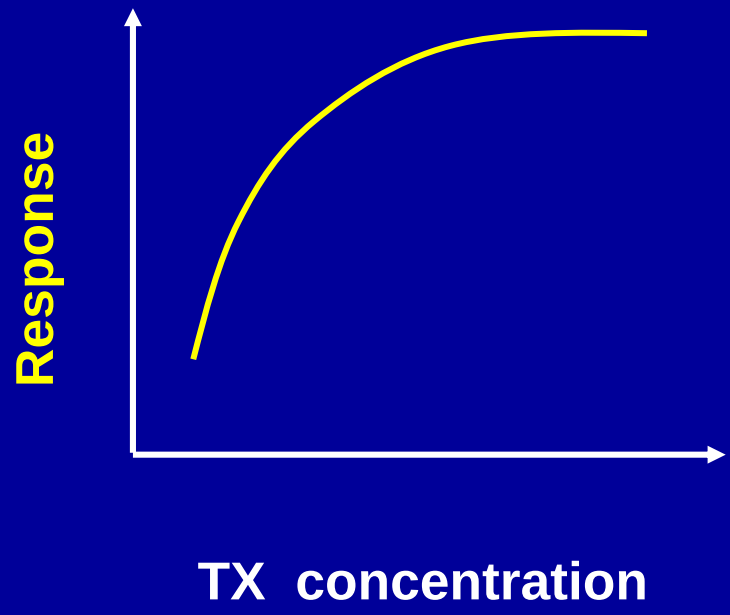

DSP
1990
2000

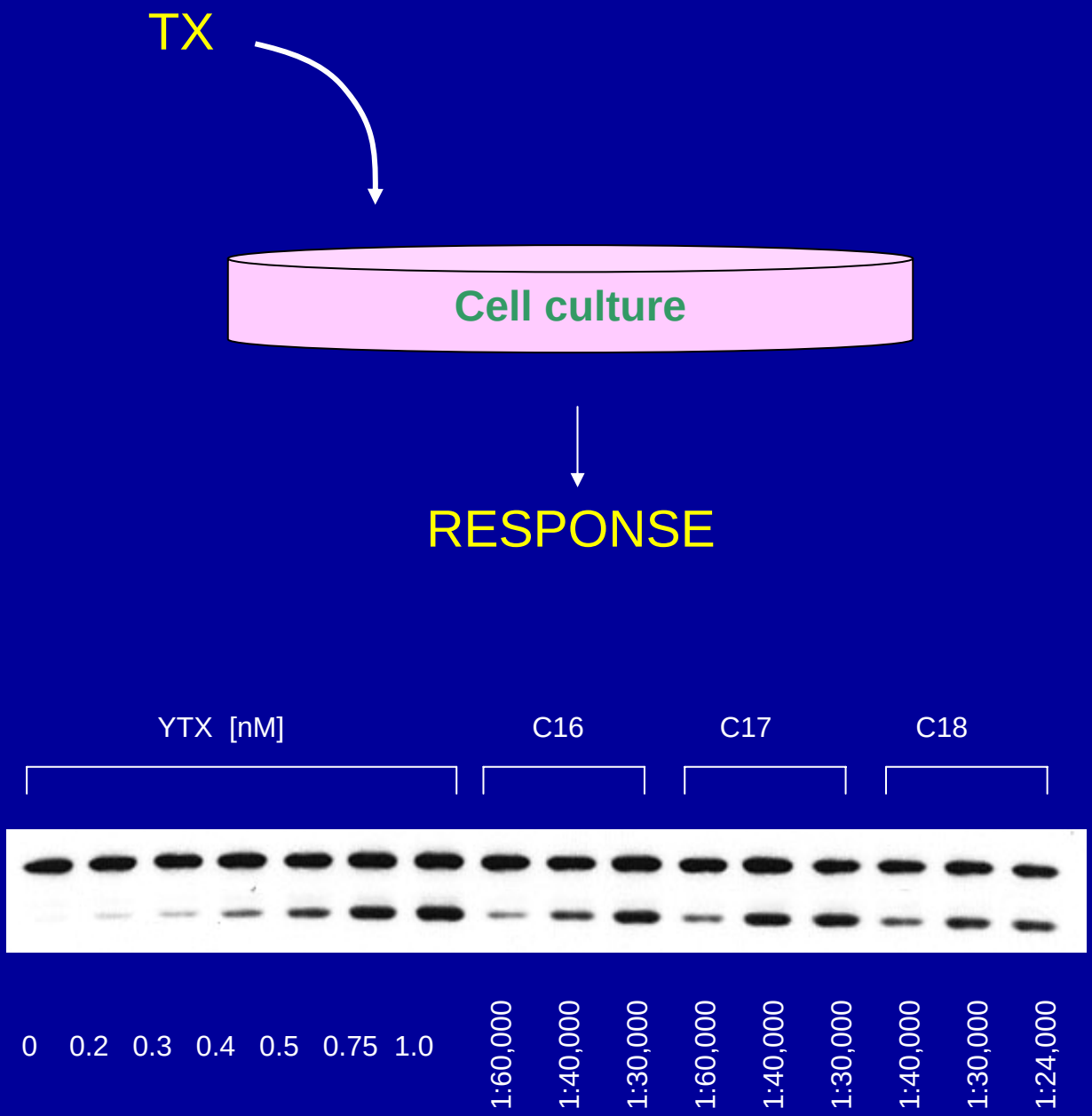
Regulation 853/2004/EC establishes the maximum levels of contaminations for some marine biotoxins in shellfish.

Regulation 2074/2005/EC lays down the recognised testing methods for detecting marine biotoxins .


Contaminant
?
Signal
Response




Response
TX concentration


TX
Cell culture
RESPONSE
YTX [nM]
C16
C17
C18
0
0.2
0.3
0.4
0.5
0.75
1.0
1:60,000
1:40,000
1:30,000
1:60,000
1:40,000
1:30,000
1:40,000
1:30,000
1:24,000

Existing functional assays for marine biotoxins

Protein phosphatase assay for okadaic acid and DTX

Neuroblastoma assay for PSP toxins

E-cadherin fragmentation assay for YTX

Cytolytic assays for palytoxins

From

Toxin-specific markers

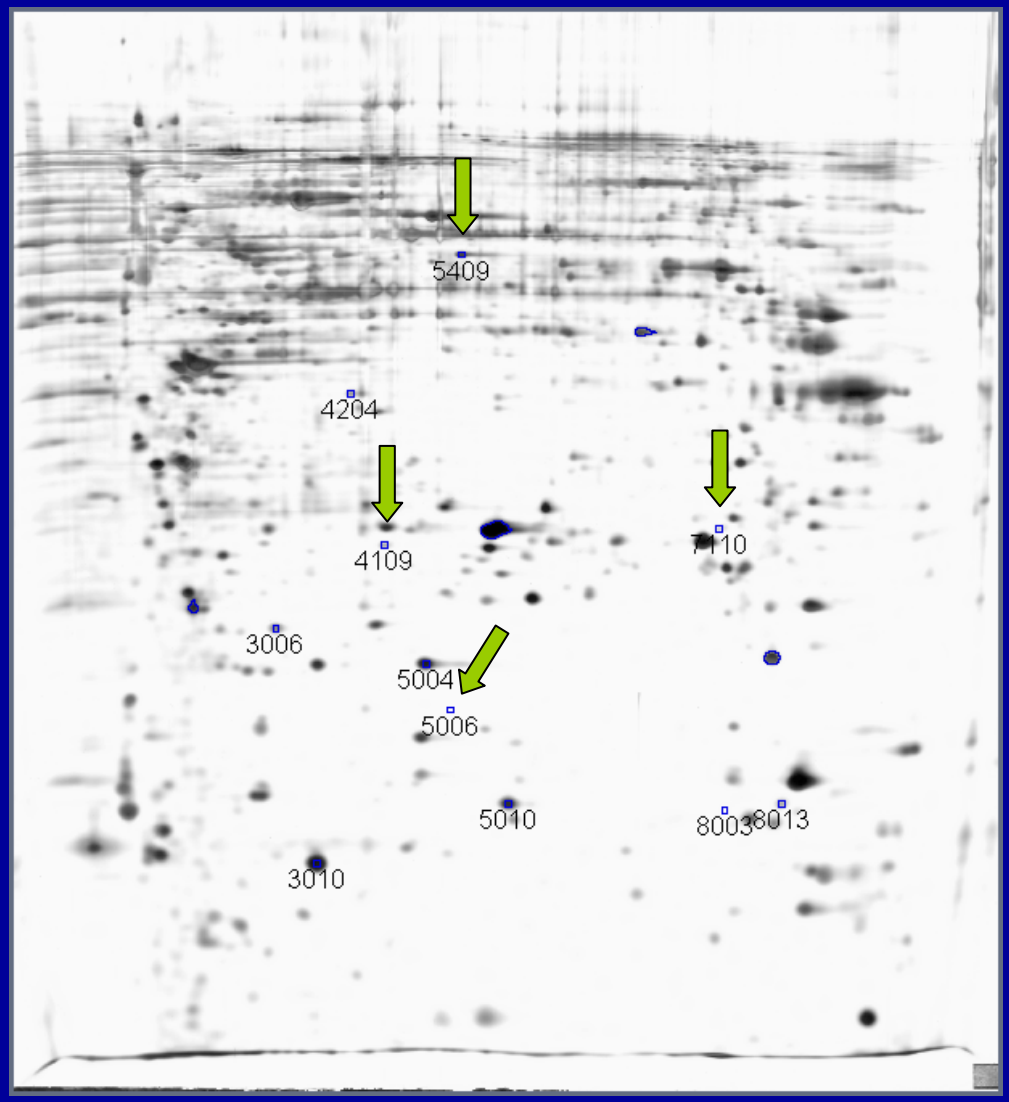
(quantify something we already know about)

To

(dis)Function-related markers

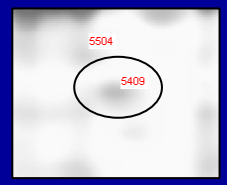
(identify something we don’t know about, but could be dangerous)

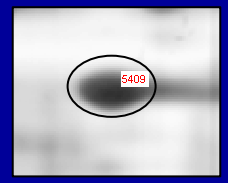
Effects of gambierol on the protein profile of MCF-7 cells

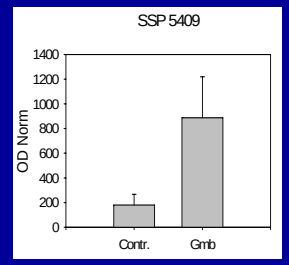


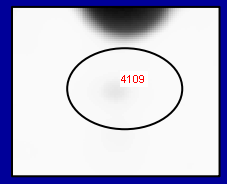
Control

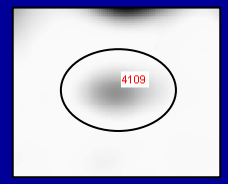
+ Gbrl

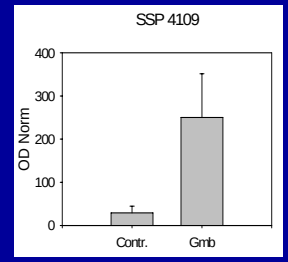


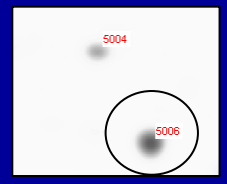


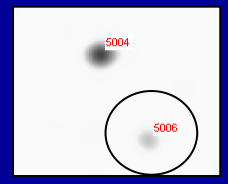


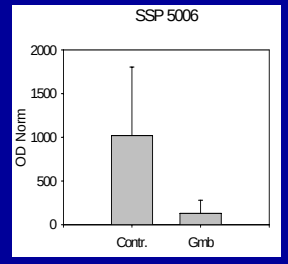


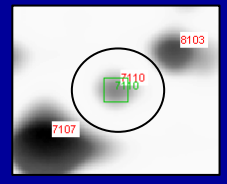


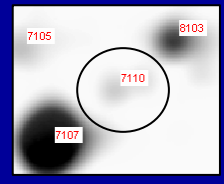


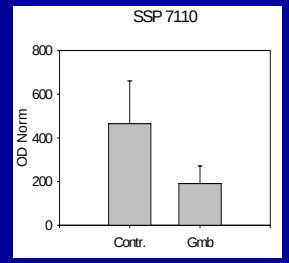












Key features for the implementation of functional assays

Measure the whole burden of biologically active agents belonging to a toxin/contaminant class

No use of experimental animals

Monitoring food for already known toxins/contaminants

Screening food for the presence of undetermined toxins

Dissemination of the methodology

Standardization and validation of procedures