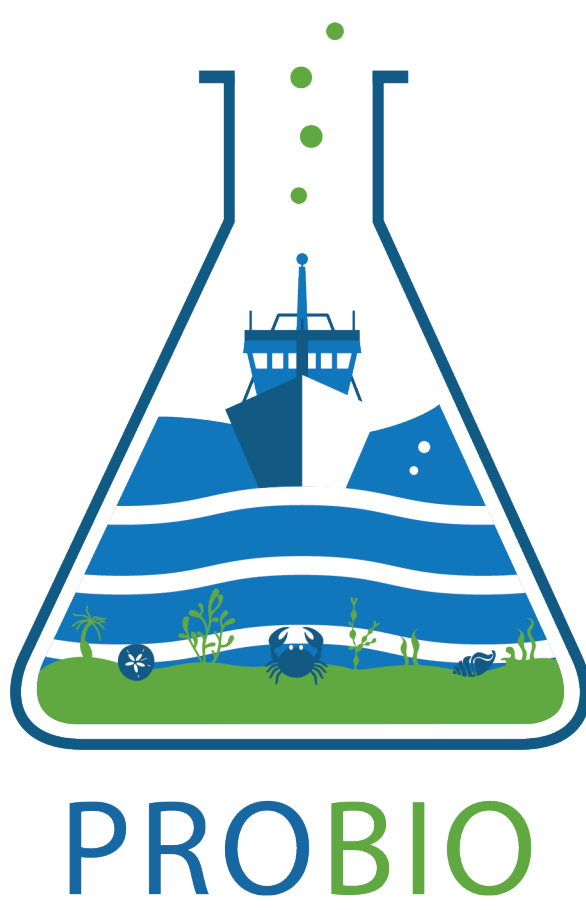


PROspection for BIOactive compounds in the North Sea (PROBIO): creating a knowledge base for blue biotech innovation in Flanders



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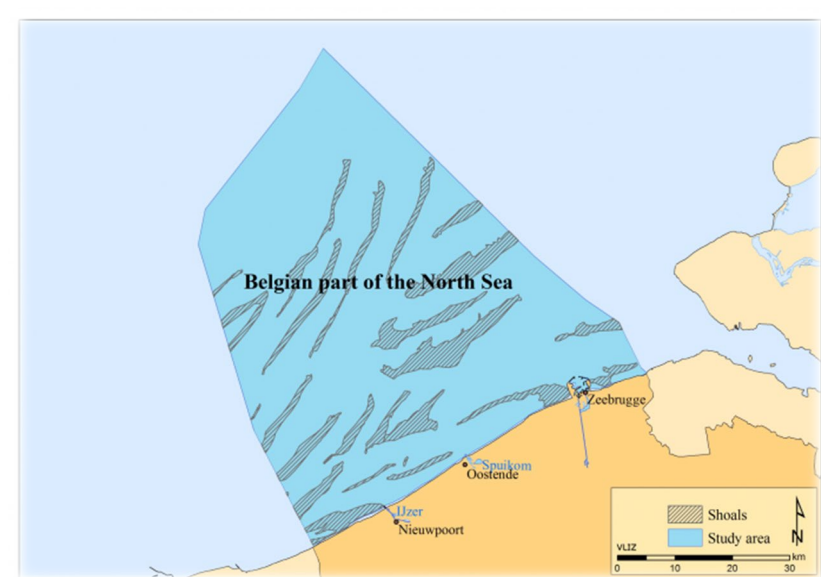
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INTRODUCTION

The potential of bioactive compounds from marine bioresources is underexplored and may offer a 'sea of opportunities' in several sectors, e.g. food and feed, nutraceuticals, pharma, cosmetics, agriculture and bio-based materials.

The present study describes our bioprospecting efforts in exploring the marine environment of the Belgian part of the North Sea with unprofiled bioactivities. Our goal is to investigate the diversity and to find new bioactive compounds with antibacterial and electrophysiological activities from local under explored marine macro-organisms.

The knowledge base generated in this project will trigger further innovation to foster new commercial developments in various sectors.



VALORISATION

Marine Compounds Database

Public Marine database



Raw data will be stored in a tailor-made database for metabolites and potential active compounds at VIB center.

These data will be disclosed, allowing new actors to explore the potential of these compounds, leading to new business cases.

User-friendly information source

All relevant scientific information will be combined into a user-friendly information source, targeting (potential) professional end-users.

Pathways of valorisation for bioactive molecules

Promising industry-driven cases will be selected, targeting a broad range of stakeholder from different sectors.

Based on several targeted workshops, a valorization plan for each case will be summarized.

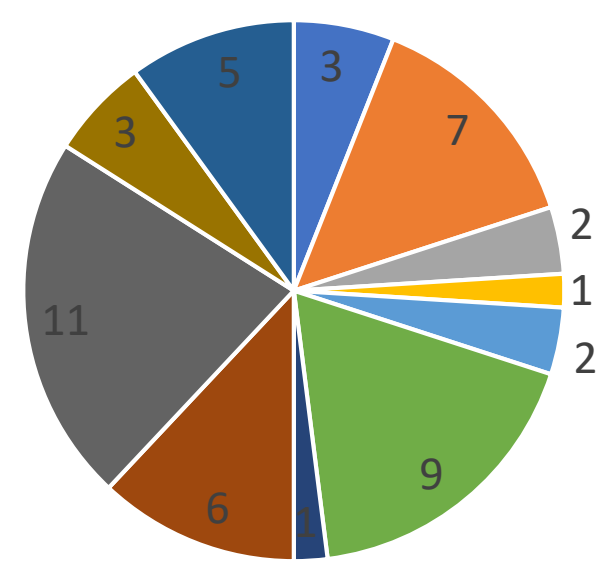
The integration of actors from industry and knowledge institutions will stimulate new innovation projects and biorefinery, aquaculture and other biotech applications in Flanders.



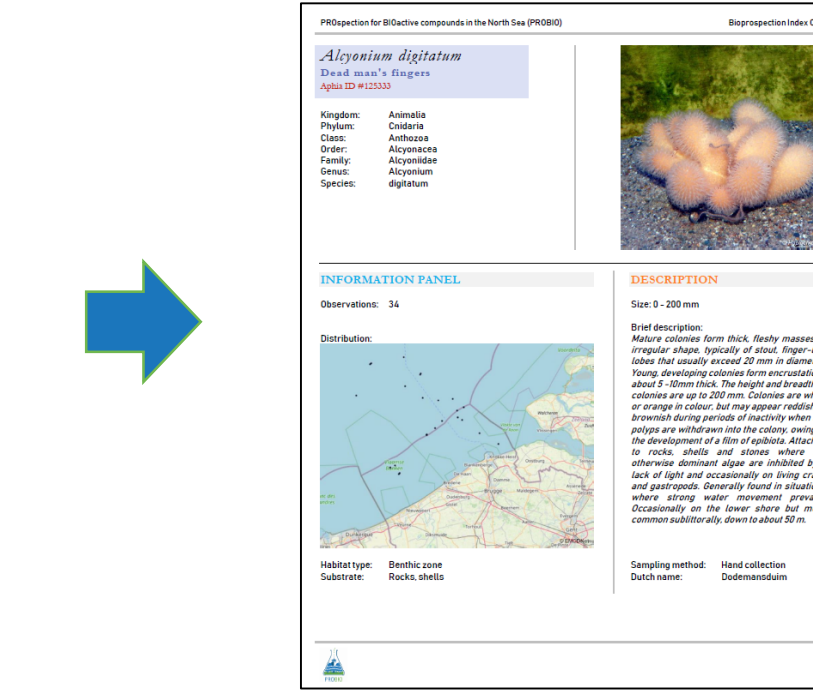
METHODOLOGY

Collection of North Sea species

- Annelids
- Arthropods
- Bryozoans
- Teleosts
- Tunicates
- Cnidaria
- Ctenophora
- Echinoderms
- Molluscs
- Sponges
- Macroalgae



Selection of 50 North Sea species with high potential for commercial valorisation.

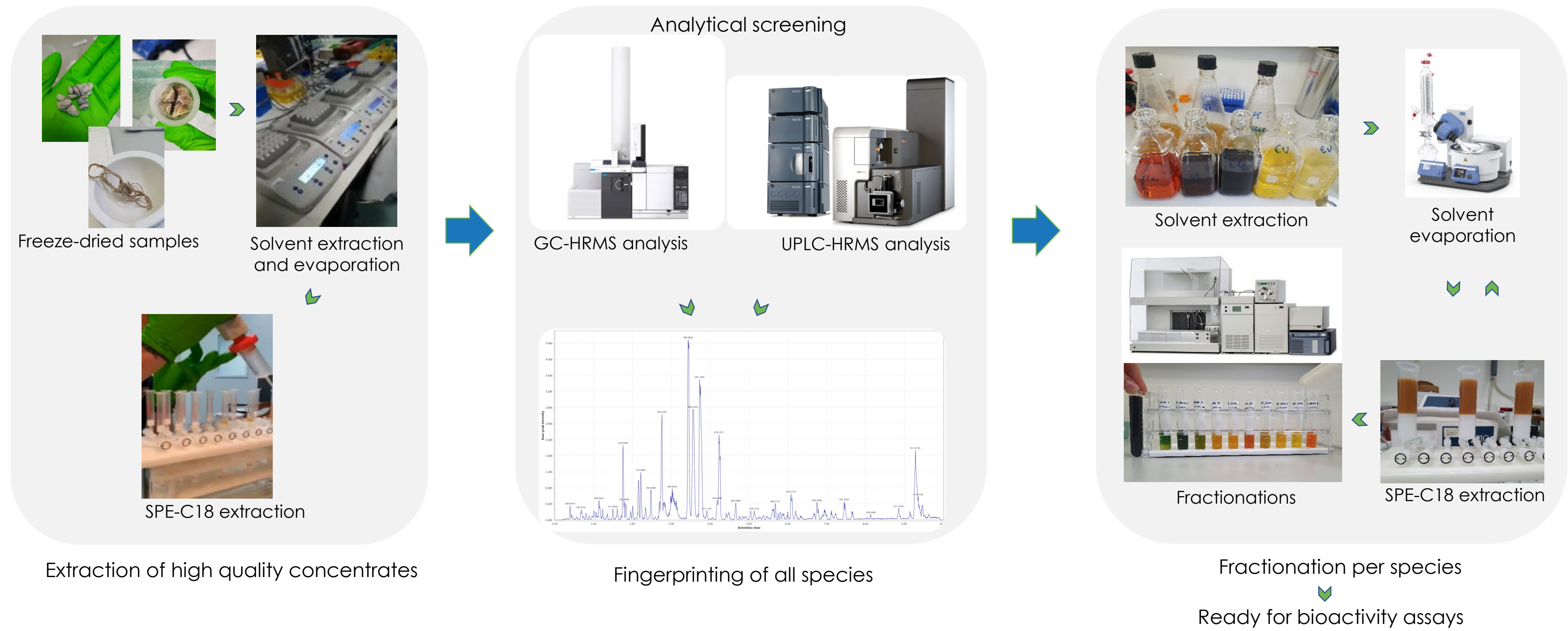


Development of 'Biospection Index Cards' providing information on potential compounds, cultivation opportunities and spatial distribution.

Sampling campaigns in 4 seasons (2020 + 2021)



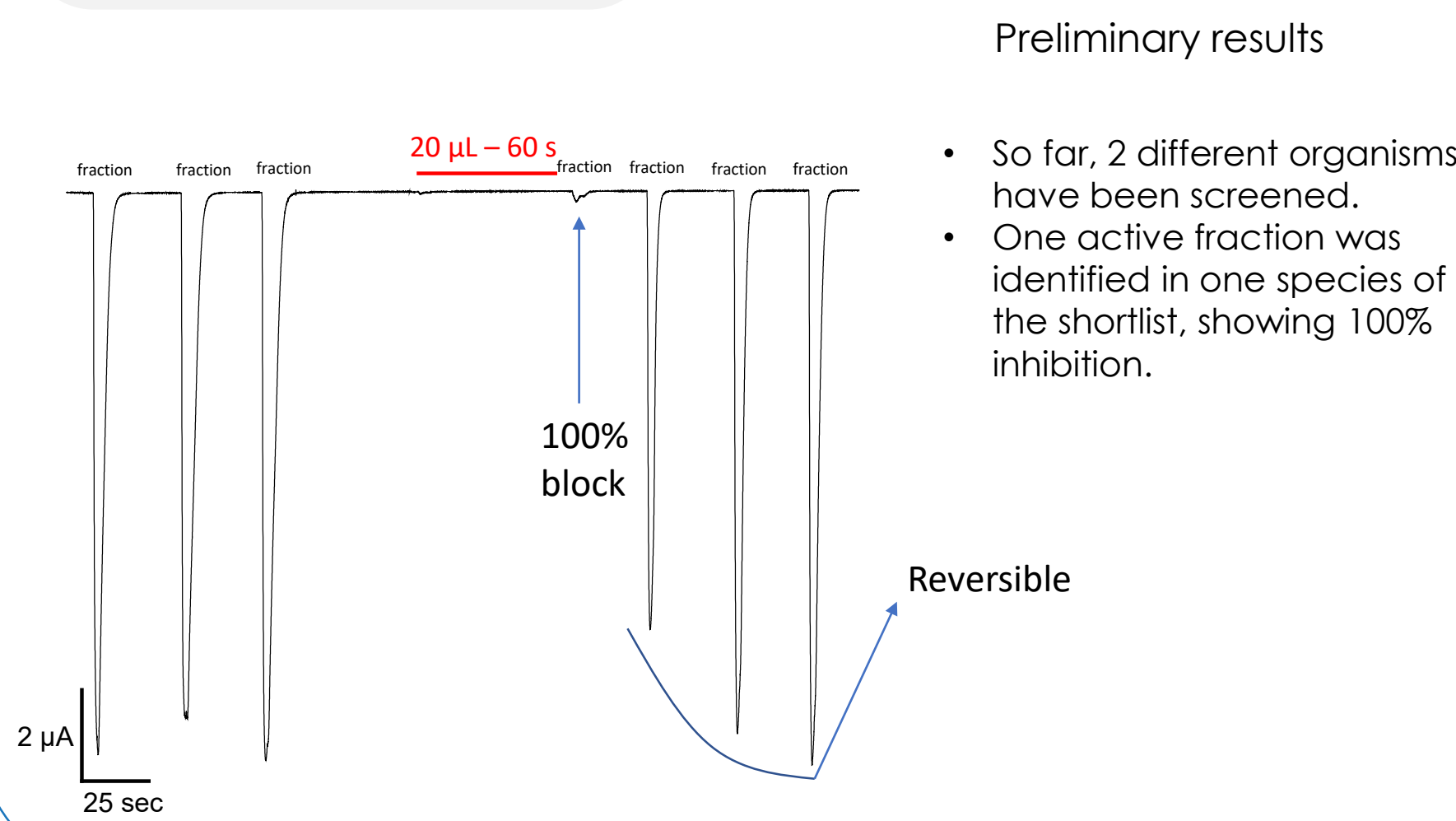
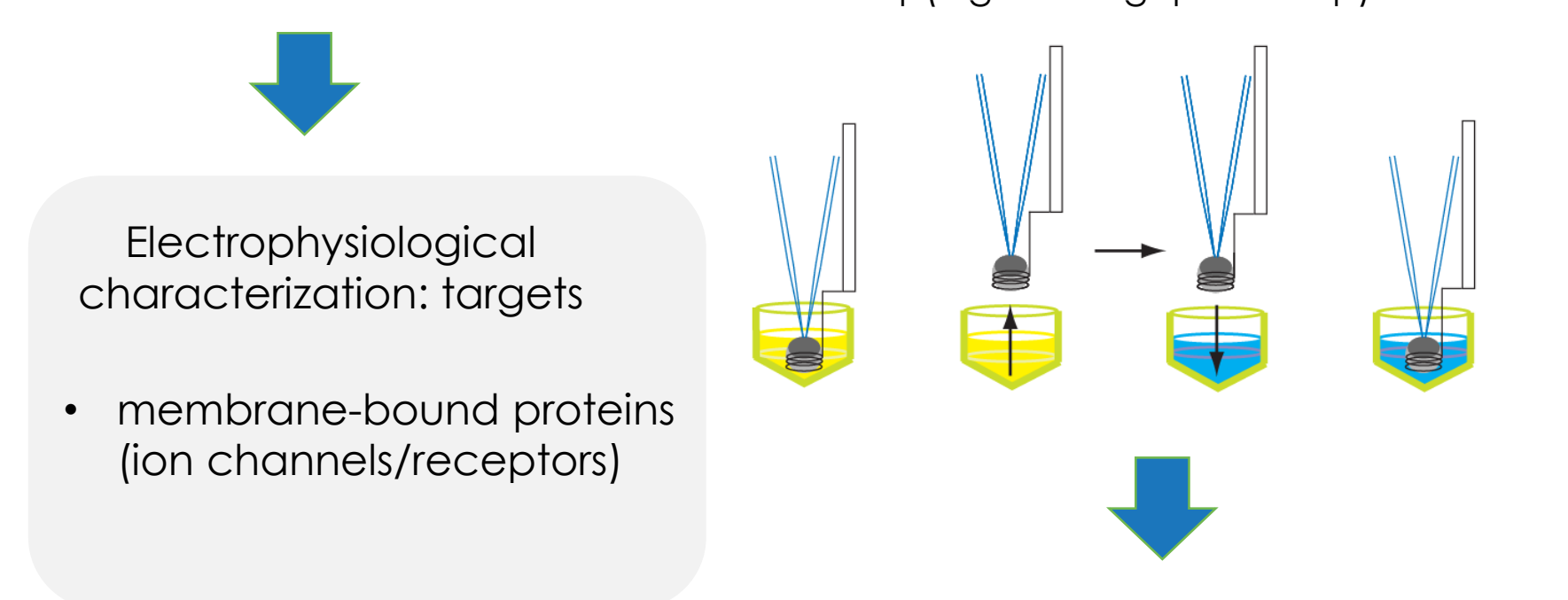
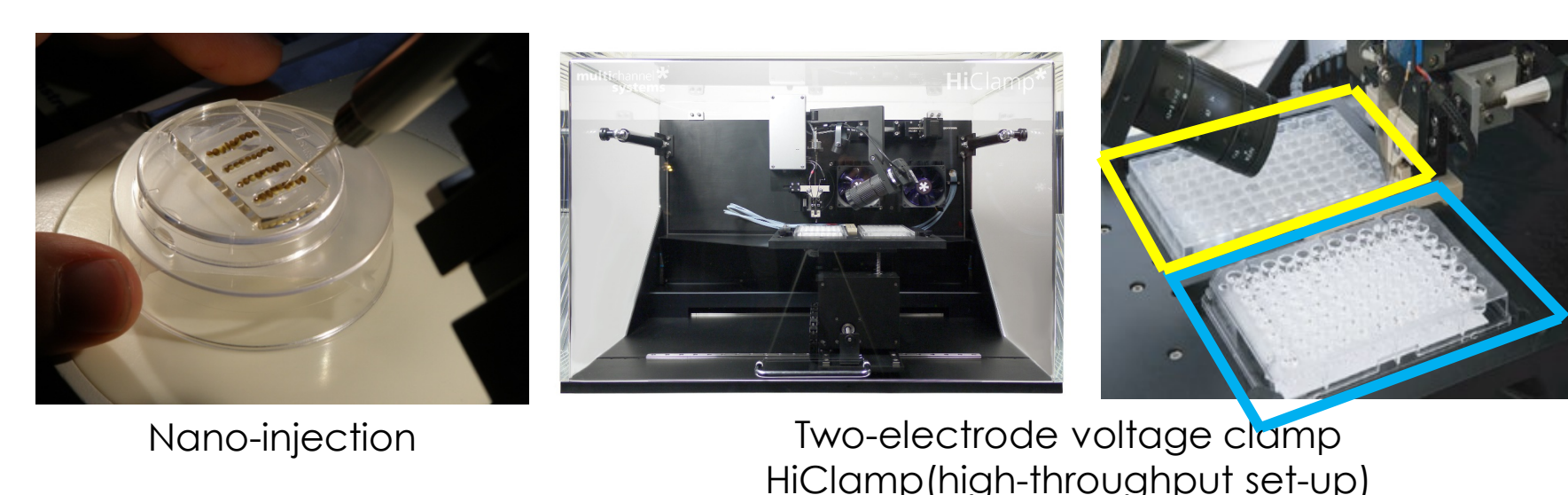
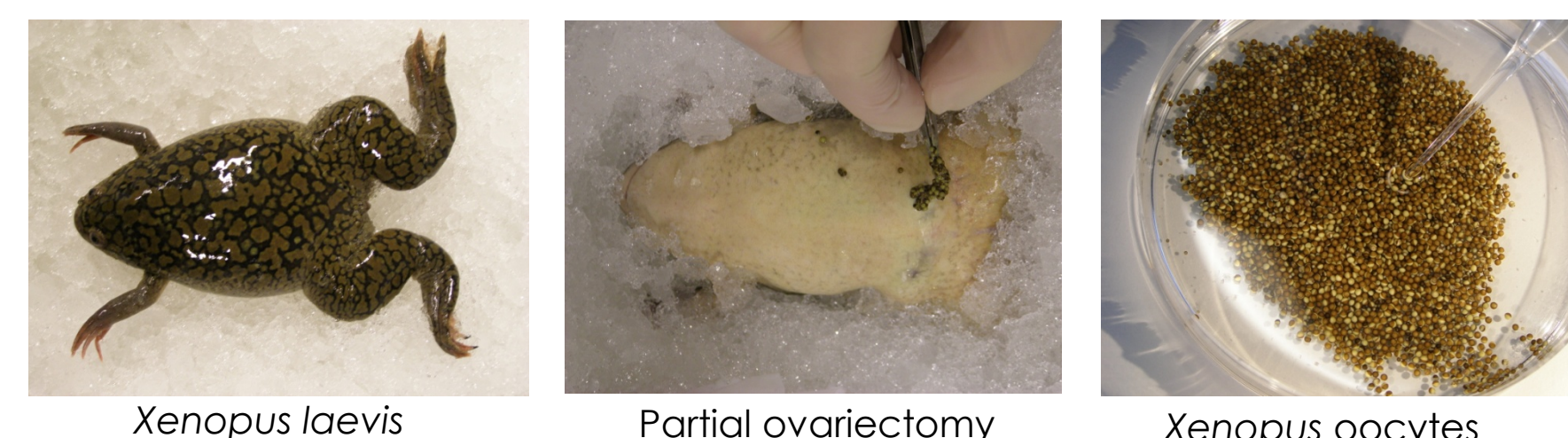
Screening for bioactive compounds



Bioactivity assays

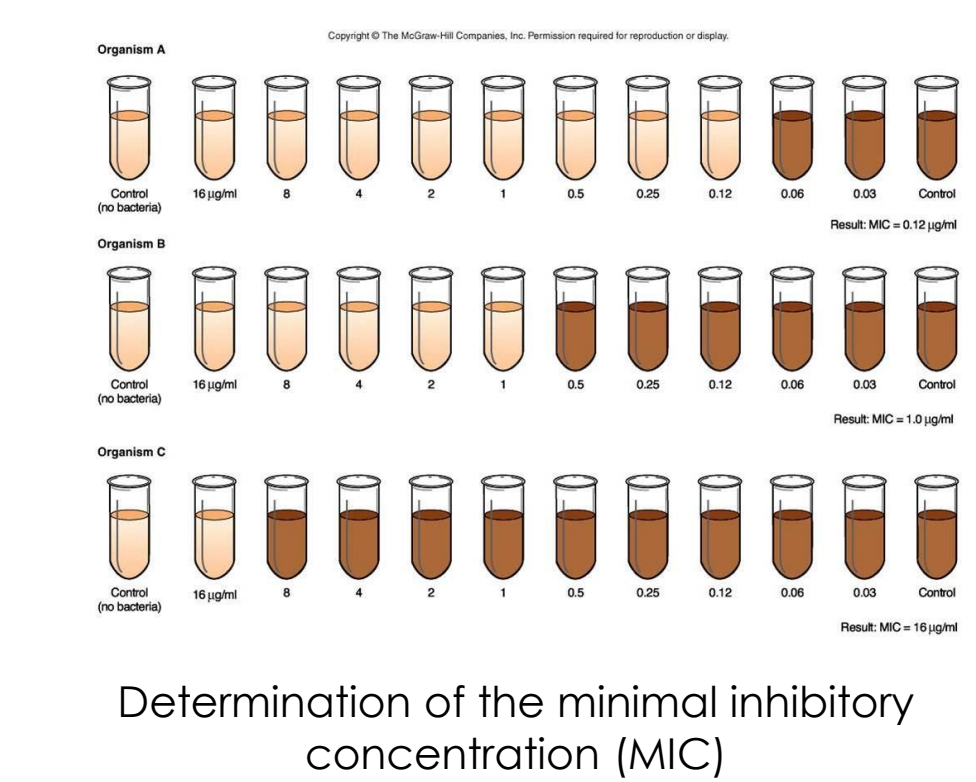
Electrophysiological testing of bioactive compounds

Methodology: experimental setup



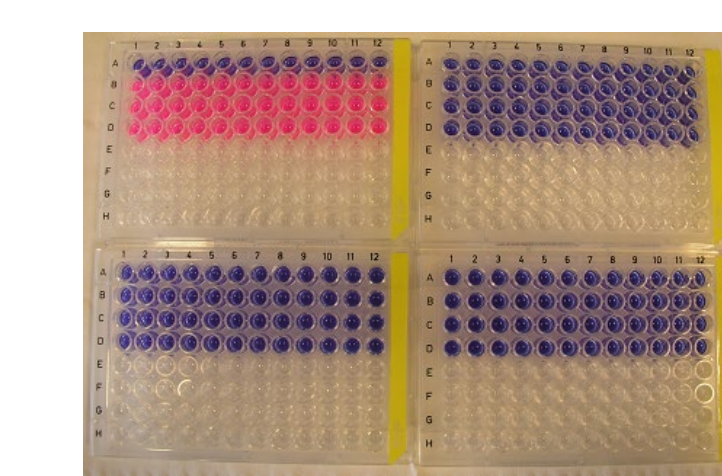
Antimicrobial testing of bioactive compounds

Methodology: experimental setup



- Testing against planktonic organisms
- Gram-negative bacteria:
 - ✓ *Pseudomonas aeruginosa*
 - ✓ *Acinetobacter baumannii*
 - Gram-positive bacteria:
 - ✓ *Staphylococcus aureus*
 - Fungi:
 - ✓ *Candida albicans*

Determination of the minimal inhibitory concentration (MIC)



- Testing against biofilms in a simple HTP system
- For compounds with MIC ≤ 40 μM
 - 96-well microtitre-plates
 - Biofilm inhibition
 - Biofilm eradication

Preliminary results

- So far, 7 sets of 96 fractions (5 different organisms) have been screened.
- Active fractions were identified in 4 out of 5 species.
- For example, Fraction 2 from one species of shortlist shows activity against *S. aureus* up to a dilution of 1/8.

