Access to marine genetic resources; Collecting organisms and facilitating samples and data

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Marbank

- a national marine biobank/public collection
- collects, preserves and catalogues marine organisms from Norwegian waters
- offers marine organisms, prepared samples and other services for academia and industry

Marine biodiversity

- Enormous biodiversity
- 240,000 marine species known to science
  + millions of different types of microbes


Invertebrates


Bacteria


Microalgae


Vertebrates


Macroalgae


Fungi

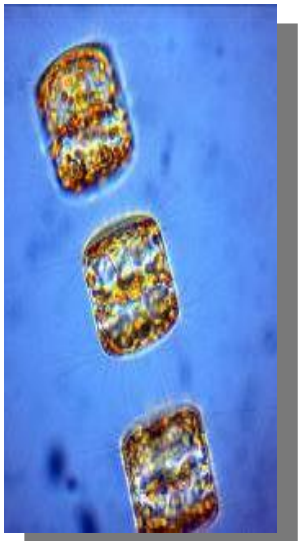
Types of access to MGRs

- ***In situ***
  - Collecting organisms from their natural habitat
- ***Ex situ***
  - Organisms removed from their natural habitat; kept alive or conserved in a new location/storage
- ***In silico***
  - Digital information on genetic sequences etc.

In situ

- All MGRs are originally collected *in situ*
- The opportunity of an authority to regulate access to collect in an area
- Statement of initial requirements and contractual agreements
- Sampling *in situ* often requires use of sophisticated technology and financial capacity
- Sampling i*n situ* can have negative impact on the environment

Ex situ

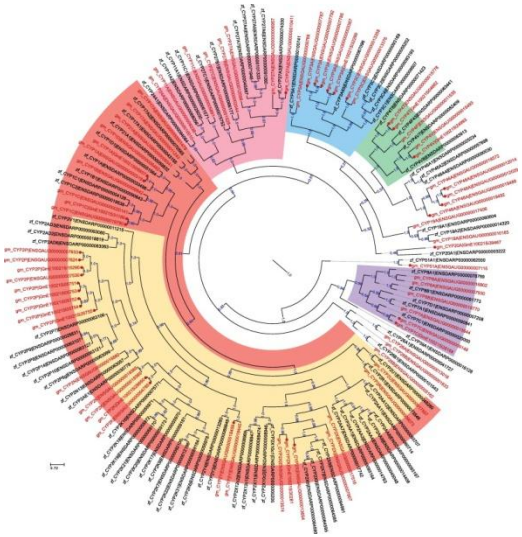


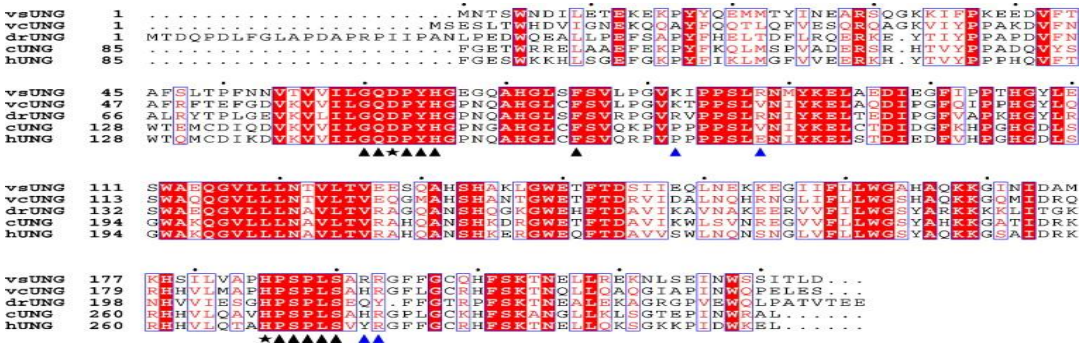

- Cultivation of stocks or strains of living organisms in a new location/in the laboratory
  - Opportunity for production of biomass
  - Opportunity to modify the production of secondary metabolites
  - Mutation
- Cryogenic conservation of organisms and prepared samples
  (e.g. storage in a repository or biobank)
- Samples can be widely distributed
  - Opportunity for researchers that do not have the ability to collect MGRs *in situ*
  - Tracking of origin can be a challenge

In silico

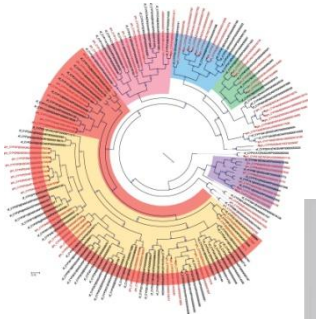
”research performed on computer or via computer simulation”

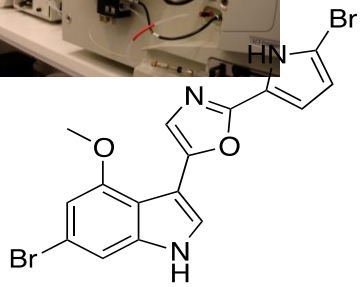
- Genetic information is made publicly available
- Free online access
- Increasing potential for discovery of new genetic functions by sequencing genomes and metagenomes
- Ownership to MGRs information ?





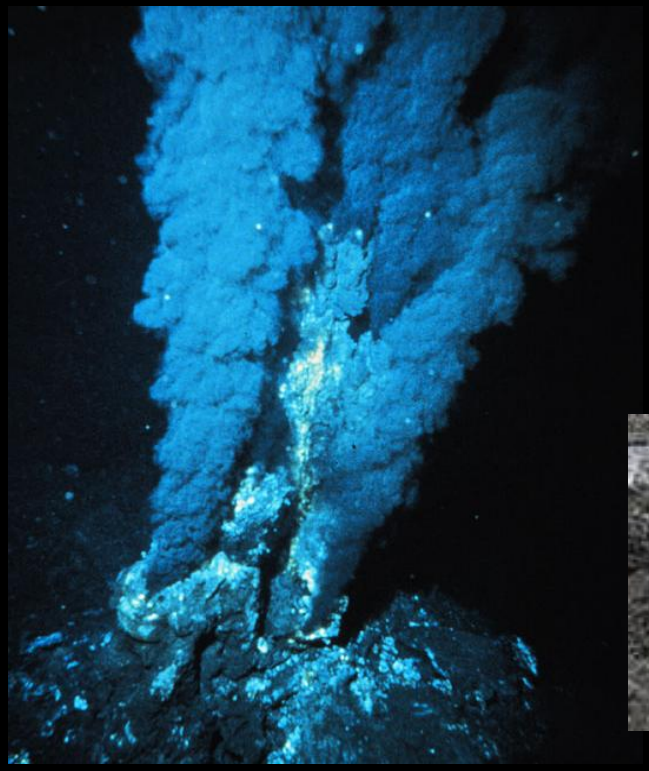
Bioprospecting
– a multidisciplinary pipeline





Collecting Biodiversity → **Repository** → **Exploring** → **Exploitation**

In situ | *Ex situ* | *In silico*



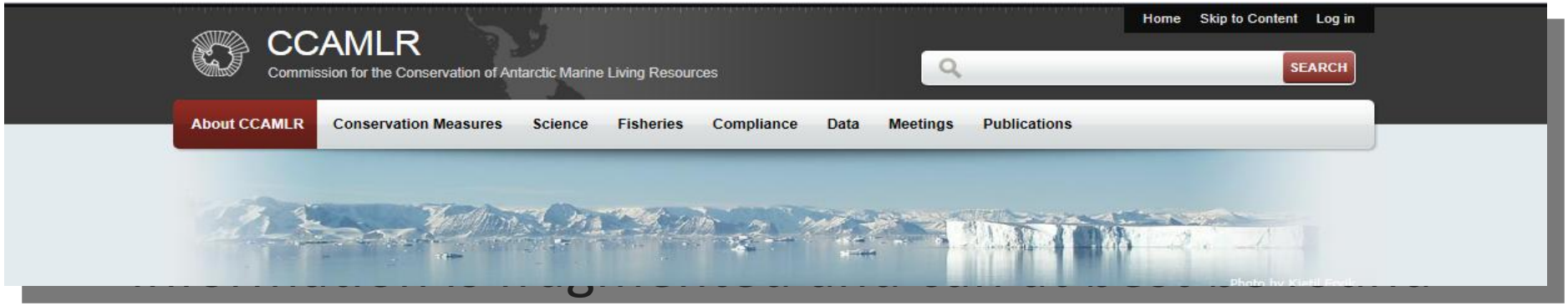
Extremophiles

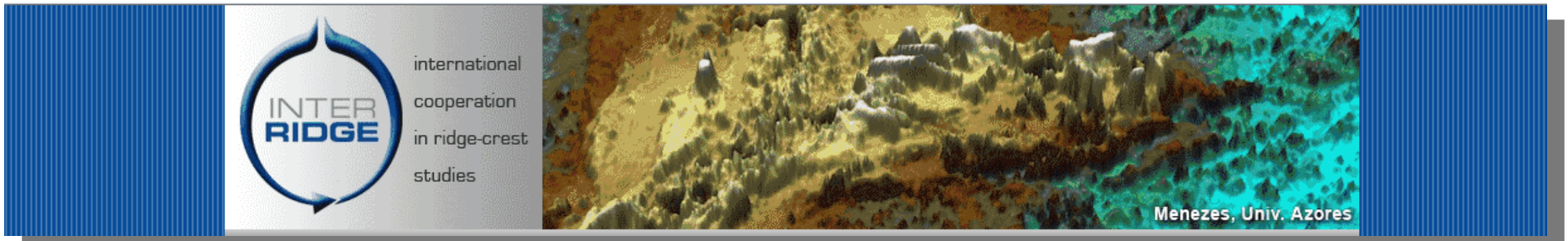
- Polar regions
- Deep Sea
- Hydrothermal vents
- others…

Information about current activities *in situ*?

- Lack of detailed information about where and what types of genetic resources are being collected
- Information is fragmented and can at best be found as part of specific research activities or programs

Information about current activities *in situ*?





How can access be facilitated and monitored?

The Norwegian experience….

New regulations for the access to and exploitation of Norwegian genetic material

- Need permission to collect and exploit
- Benefit sharing; royalty on sales

Photo: ©University of Tromsø

DIRECTORATE OF FISHERIES

- Gives permission to access and exploit marine biodiversity within Norwegian jurisdiction
  - Scope for the access?
  - Types and amount of material?
  - Collecting where and when?
  - Transfer of material/results to third parties
  - Fee structure for benefit sharing
- Public collections can get mandate to sign contracts and distribute genetic material

Good cooperation …

Photo: ©H.C. Eilertsen, University of Tromsø

Thank You!

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