

The potential role of regions in the development of European Research Infrastructures. The example of EMBRC

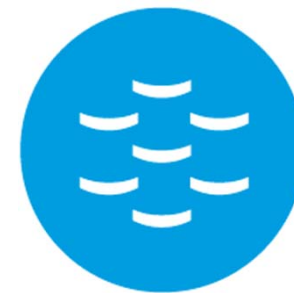
What is EMBRC

Expected scientific impacts of EMBRC

Potential societal and economic impacts

Needs at current and future stages

**Bernard Kloareg, Station Biologique
de Roscoff, Brittany, France**



EMBRC
EUROPEAN
MARINE
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« European marine biological resources center » (EMBRC).

ESFRI panel “Biological and Medical Sciences”

Roadmap 2006

- **BBMRI - Biobanks**
- **EATRIS - Translational research facilities**
- **ECRIN - Clinical trial platform**
- **ELIXIR – Data repositories**
- **Infrafrontier - Mouse archives and clinics**
- **INSTRUCT - Structural biology facilities**

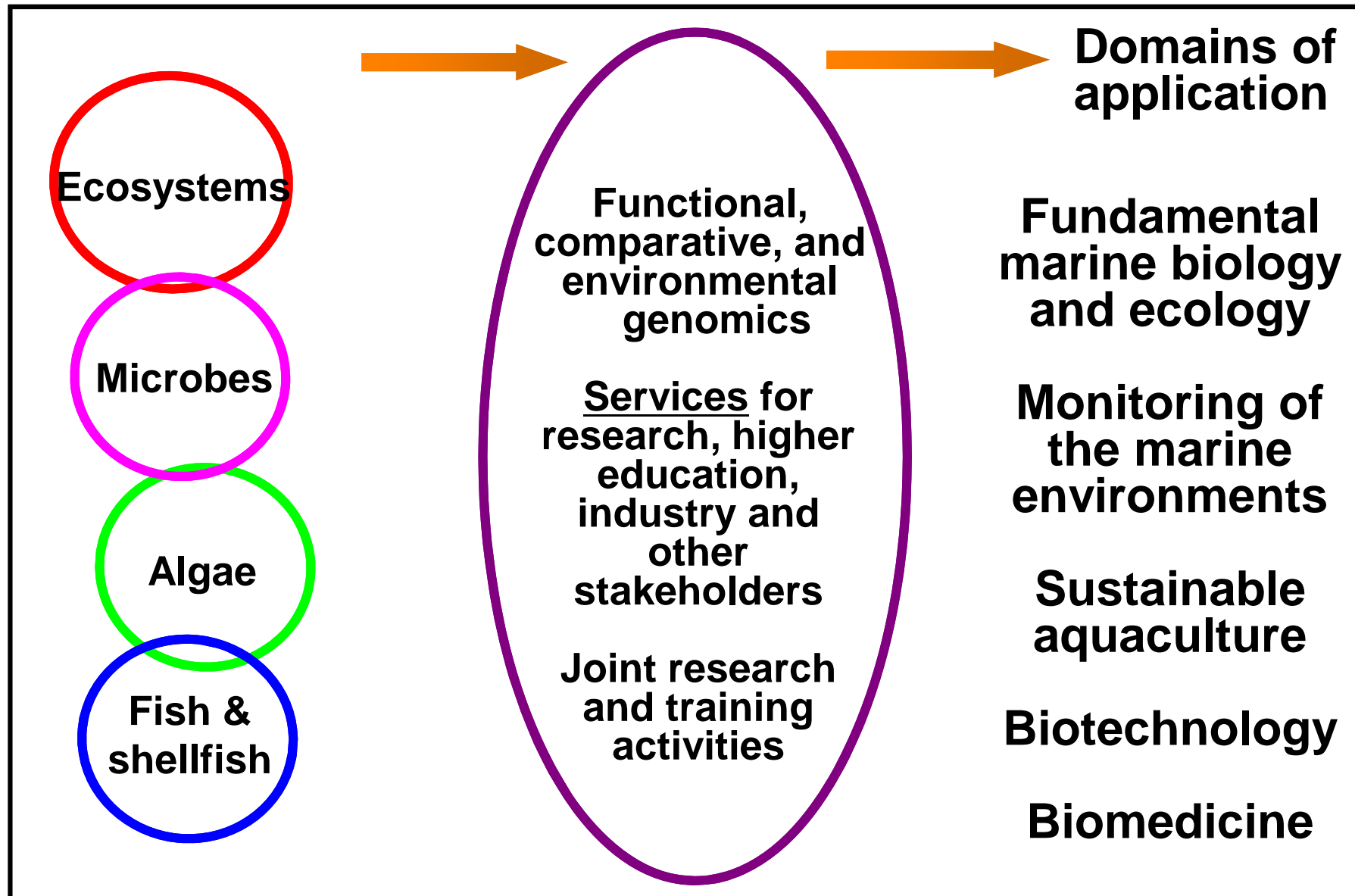
+ Update 2008

- **EMBRC - Marine biological resources**
- **ERINHA - High-security labs**
- **EuroBioImaging – Imaging facilities**
- **EU-Openscreen - Chemical libraries**

+ Update 2010

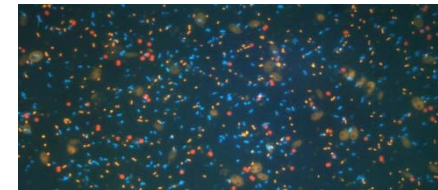
- **ANAE - Analysis and experimentation on ecosystems**
- **ISBE – Infrastructure for systems biology**
- **MIRRI – Microbial resources**

EMBRC (ESFRI-BMS) is a key to capitalize on the outputs of the NoE “Marine Genomics Europe”



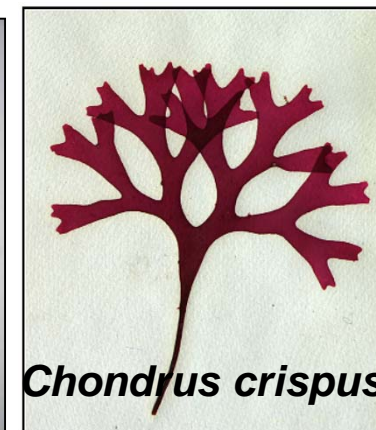
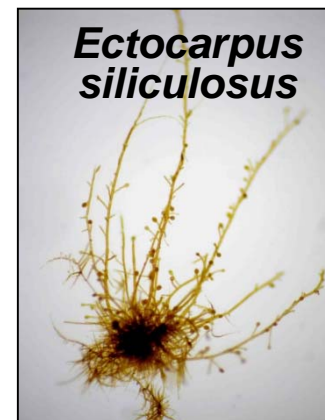
Marine laboratories are unique and essential for marine research (in partnership with vessels, satellites, remote systems etc.)

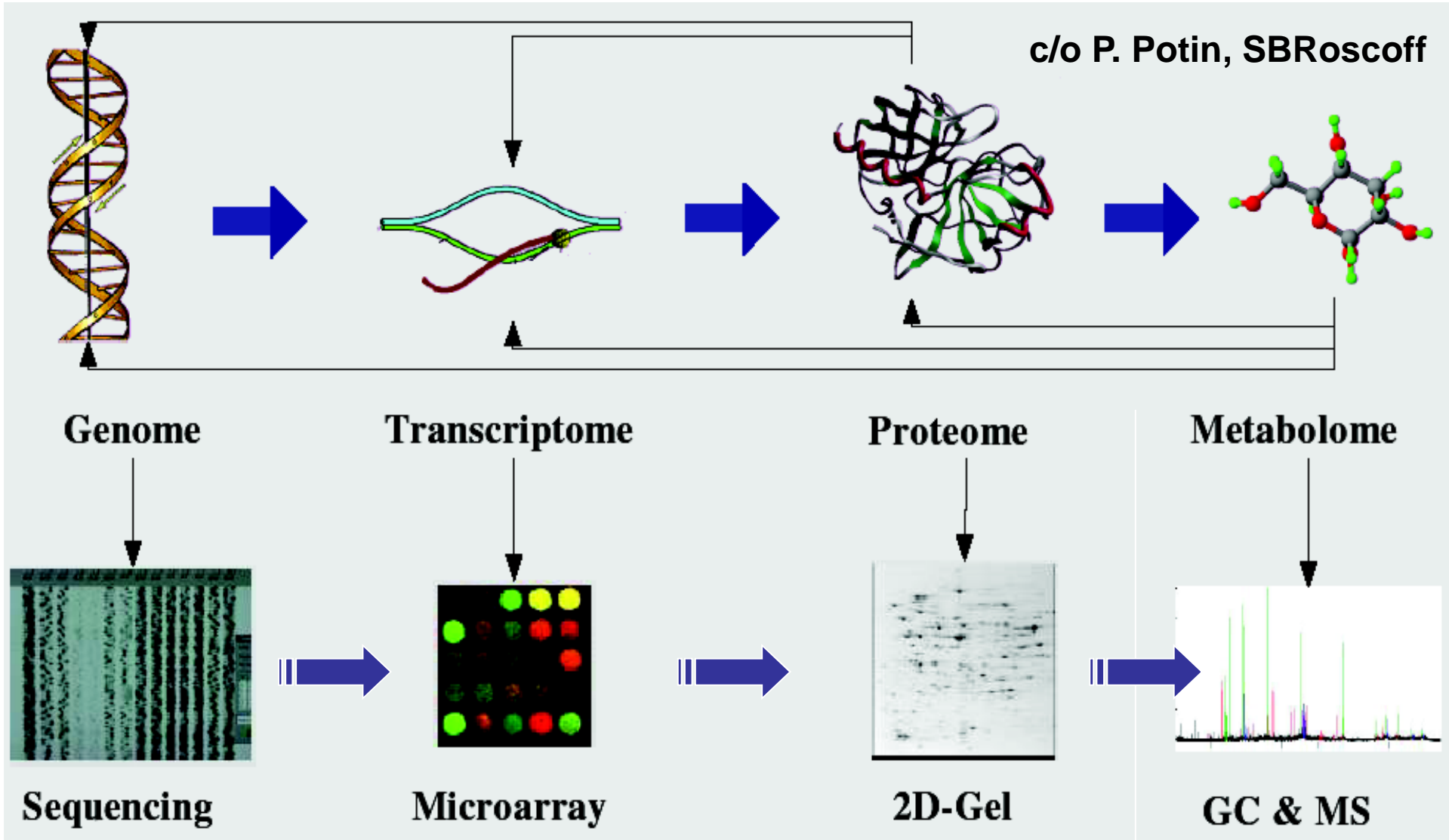
- **Providing access to marine ecosystems including valuable (historical) time-series data**
- **Providing access to marine models for biomedicine, ecotoxicology, biodiversity, gene discovery**
- **Providing logistics for ex situ experiments, including modern equipment for biology**
- **Providing logistics for hosting and catering**



Access to the marine biological resources

Access to this resource requires the culturing or raising of a variety of micro- and macro-organisms.





The omics revolution. Marine biologists now have access to all of the components of marine life, from genes to metabolites.

EMBRC was primarily conceived to give access to these unique biological and genomic resources



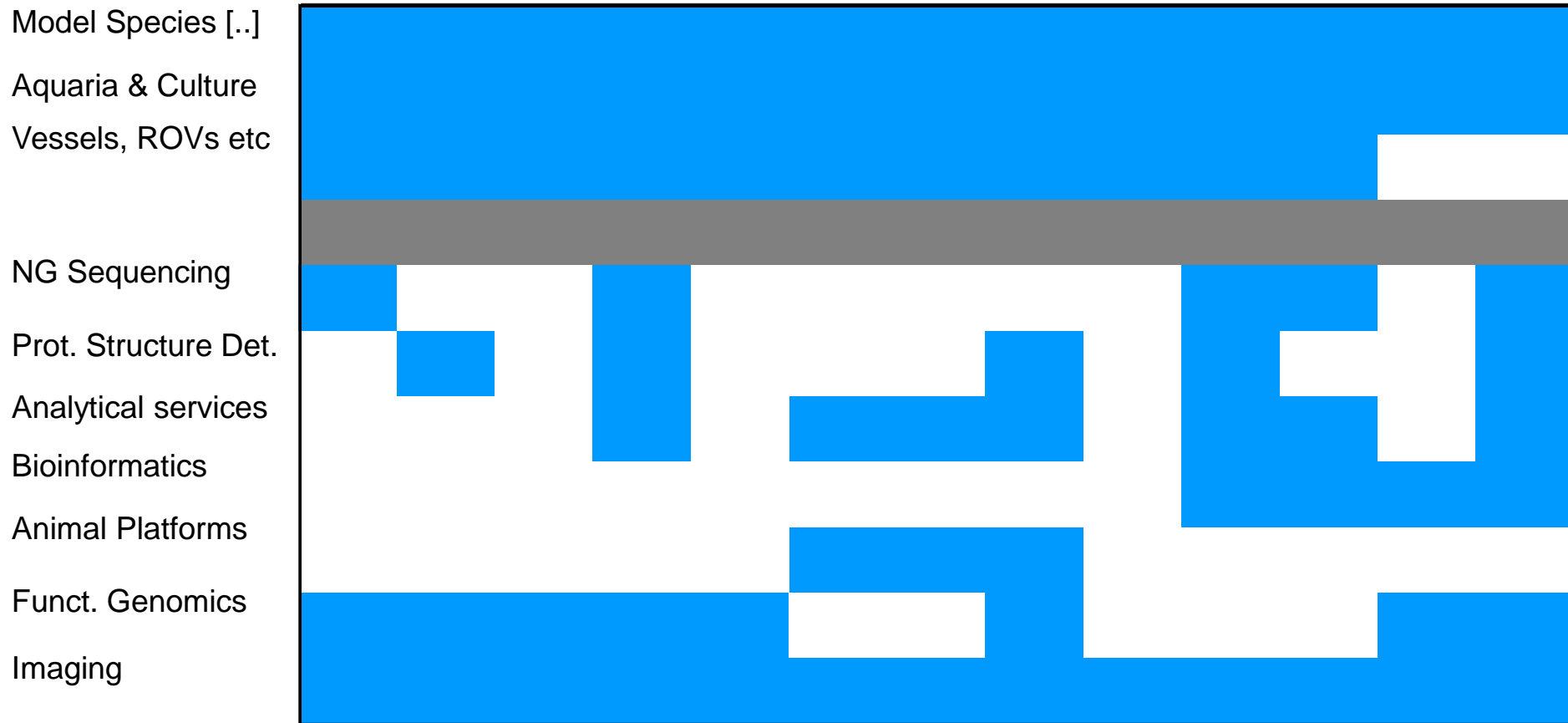
WWW.EMBRC.EU, c/o Euan Brown, SZ Anton Dorhn, Naples

Mapping of large-scale partner capacity onto research services

EMBRC- France

EMBRC- UK

SZN UGOT OOB SBR OOV MBA SAMS USTAN CCMAR AWI HCMR SARS EMBL





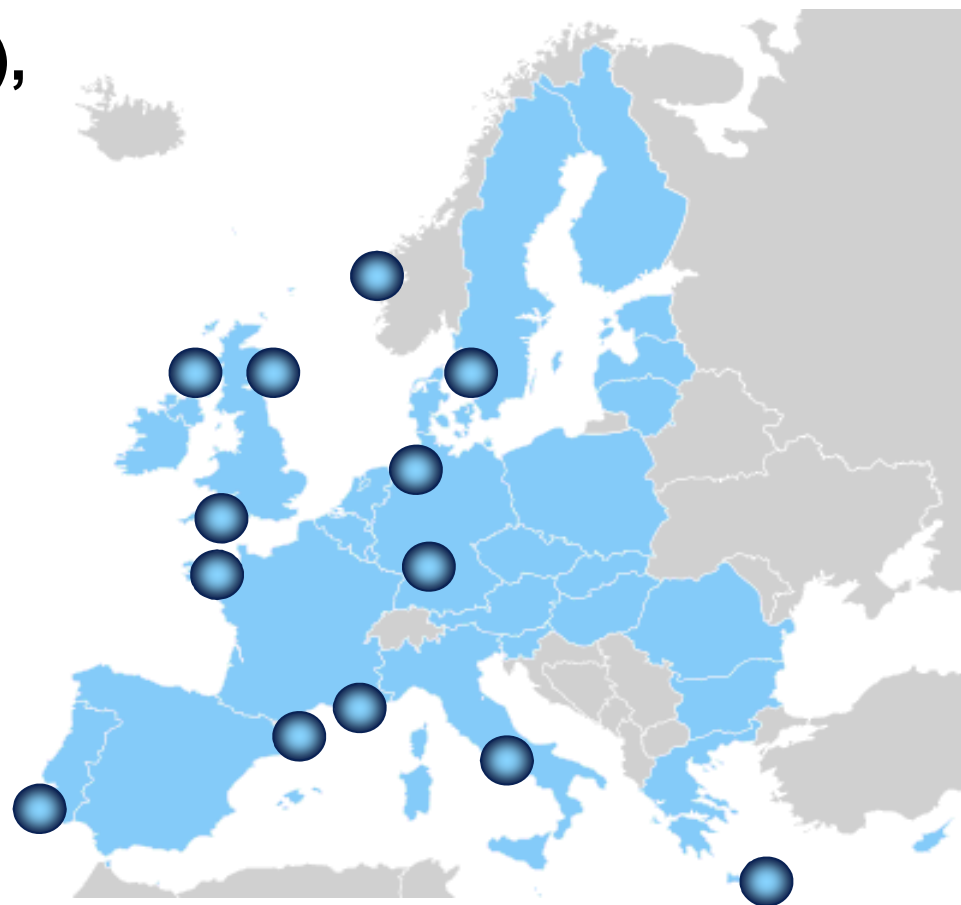
EMBRC, a distributed, pan European Research Infrastructure (RI)

**12 Marine institutes (stations),
EMBL
9 Countries
300 Scientists**

**Aspiring partners in
Ireland, Israel, Spain,
Russia, Lithuania, Turkey,
the Netherlands ...**

Time-line:

**Preparatory phase: 2011 - 2014
Construction phase: 2014 - 2019
Operation phase: 2016 - ---**



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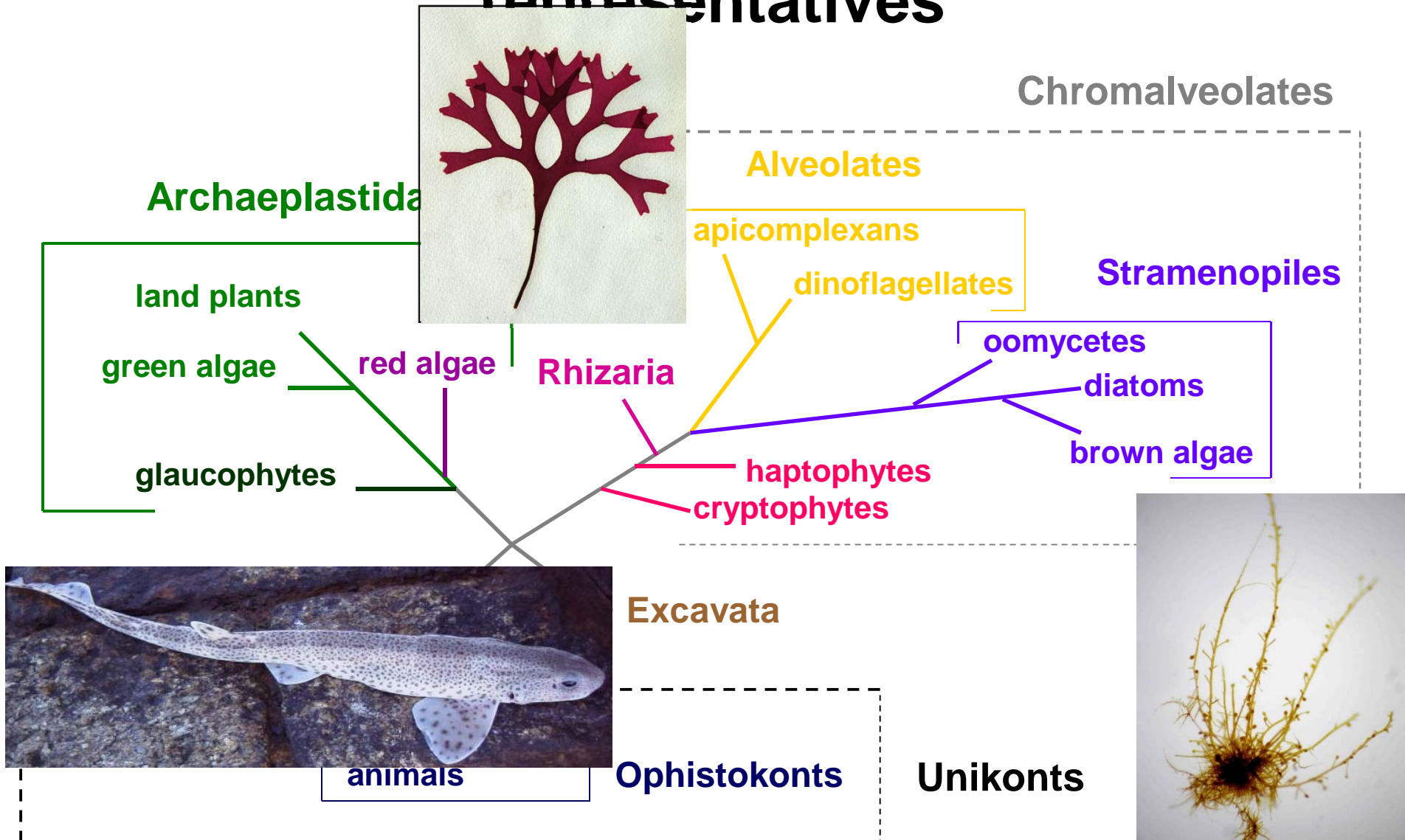
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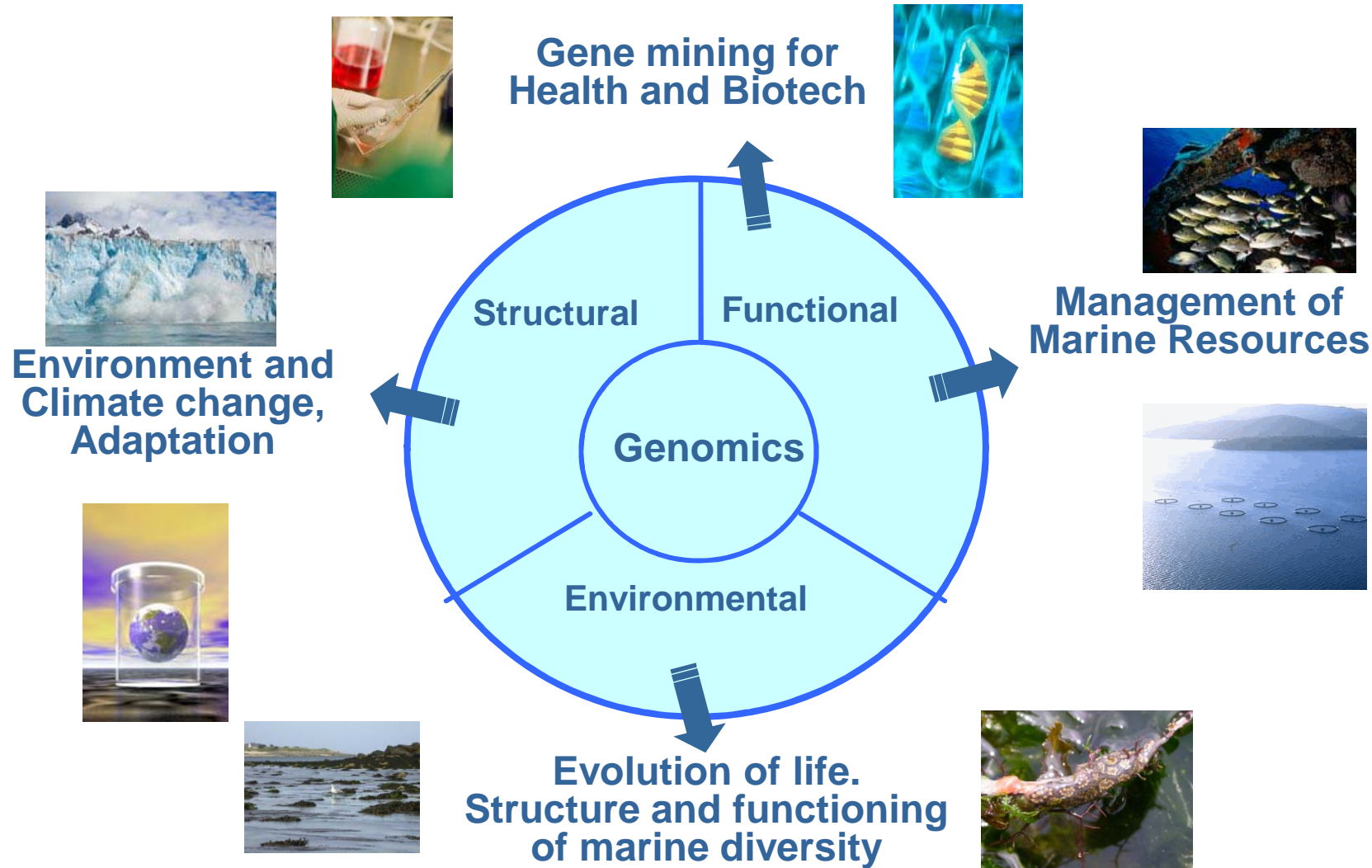
Many major lineages do not have terrestrial representatives



They are a major asset for evolutionary biology. They also feature unique primary or secondary metabolites

Contribution of genomics to marine sciences

c/o Catherine Boyen, SB Roscoff

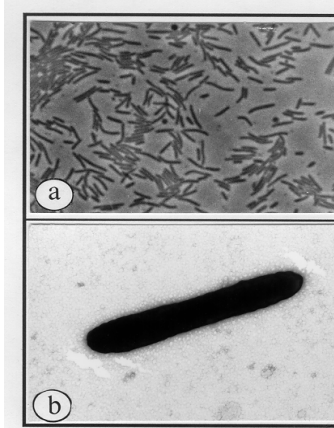


Marine genomics allows to draw **global conclusions** about our surrounding environment and to take a **holistic approach** to ocean management

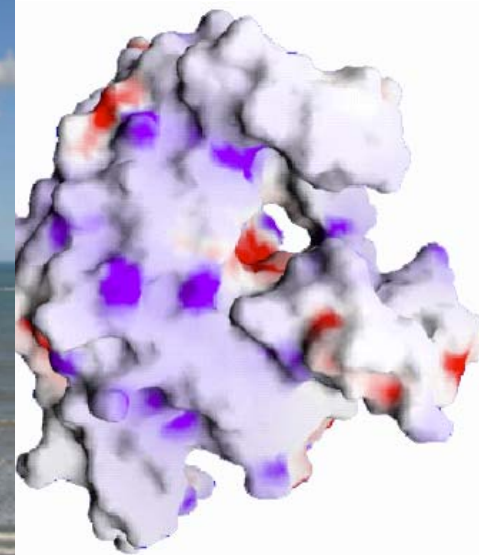
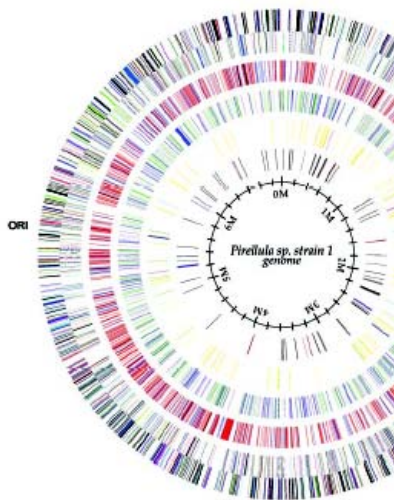


Main challenges for the « omics » in marine strategic research : to provide a knowledge basis for fisheries and aquaculture

Marine biodiversity, an under-tapped resource for the mining of new molecules and bio-processes



The cover of a position paper from the European Science Foundation Marine Board. The title is "Position Paper 15 Marine Biotechnology: A new Vision and Strategy for Europe" dated September 2010. The cover features a collage of images: a blue background with a white fish-like shape, a laboratory setting with a scientist, a beach scene, and a close-up of orange sponges.



**Global market of marine biotechnologies in 2010:
€ 2.8 billion, growth rate 4-5%**

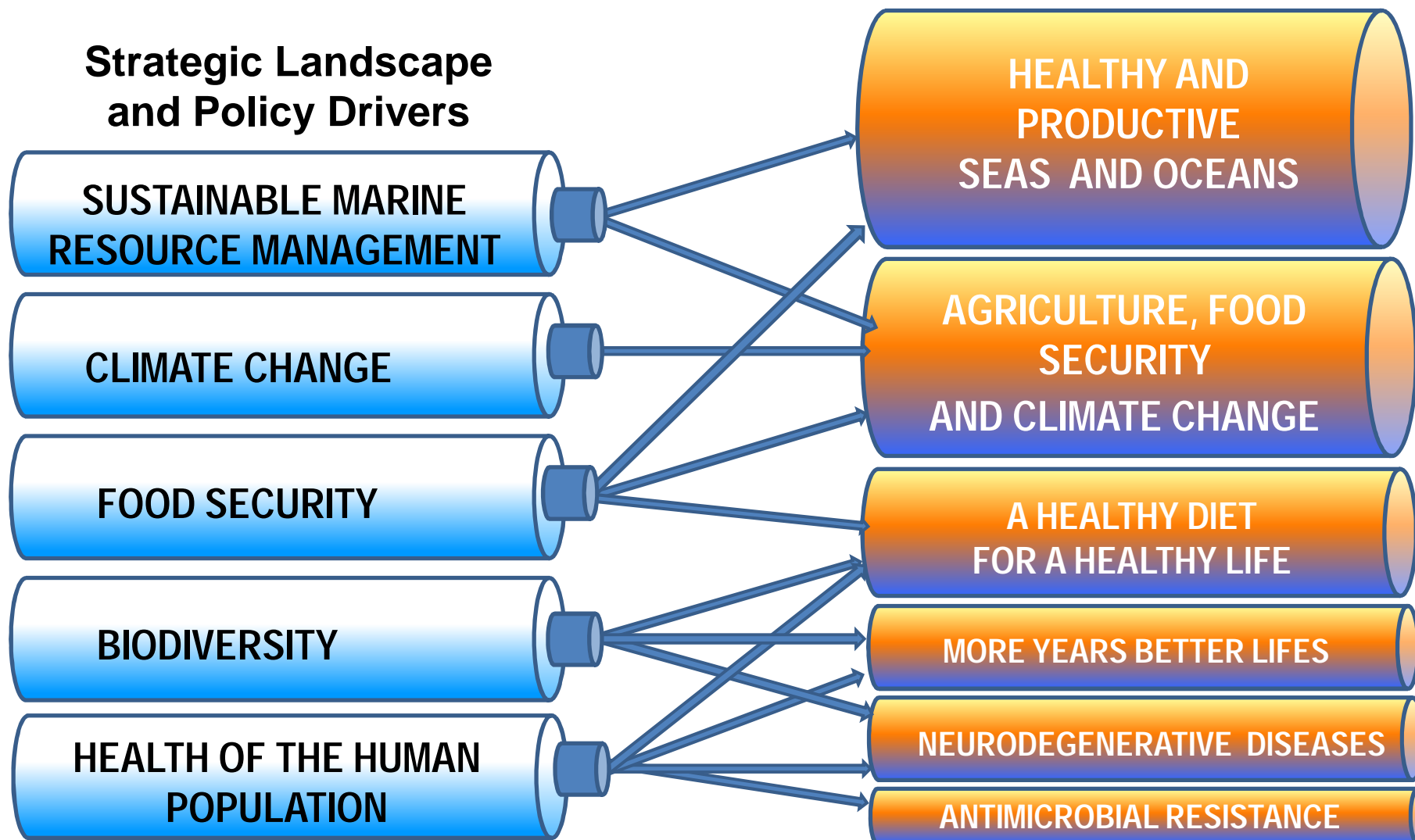
Biological Sciences		Biological Resources and Production Systems			Medical Sciences Host-pathogen interactions		
Evolution, Development and Diversity of Organisms	Anatomy and Physiology of Organisms, Behaviour and Ecology; Interaction of organisms	Plants, Animals Micro-Organisms, Bio Energy and Bio Fuels	Sustainability Safety and Quality, Health and Welfare, Infectious Diseases, Zoonoses	Human Nutrition, Aquaculture, Agrifood, Livestock Production	Epidemiology	Diagnosis, Prevention, Therapy	Public Health
« blue sky » and strategic marine biology and ecology							

Because of the recent progress of integrative biology, basic and applied research in marine biology and ecology now encompass a continuous field of science, which benchmarks fairly well with every aspect of « terrestrial » biology.

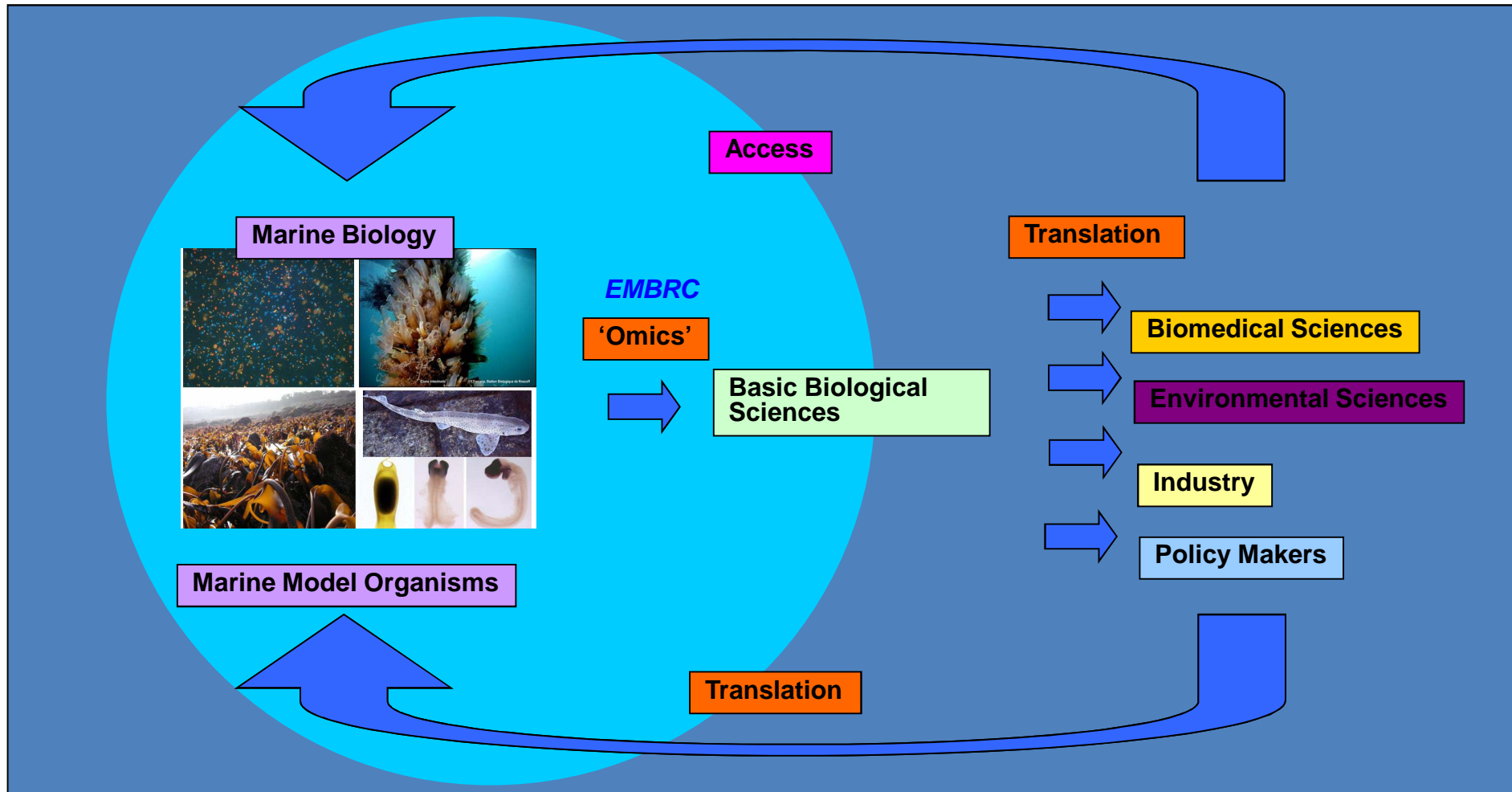


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Potential links with JPIs



EMBRC European Marine Biological Resource Centre



Convergence of European initiatives for the exploration of marine bio-resources

Providing a ccess and service to explore the marine biological resources



Bridging the gap between research and business



Sustaining research programming on marine biological resources

- Grand challenge + Marine Biotech ERA-NET



EMBRC (ESFRI): our missions

A broadly accessible **infrastructure**, consisting of the main coastal marine laboratories in Europe with a capacity to **provide access to marine organisms and the associated genetic resources**, for academia and industry, including from outside of Europe.

Enabling high-level research in basic biology, marine biology and ecology by integration with modern technology and 'omics' platforms.

Higher education in marine biology and ecology as well as in other areas of marine sciences.

Innovation: mutualization of **knowledge transfer** towards industry, policy makers and **science mediation** towards the general public. Cooperation in technology transfer and IP brokerage.

Human capital, public-private partnerships, the Union policy and international cooperation will **converge in EMBRC** to fulfil the innovation potential of marine bio-resources

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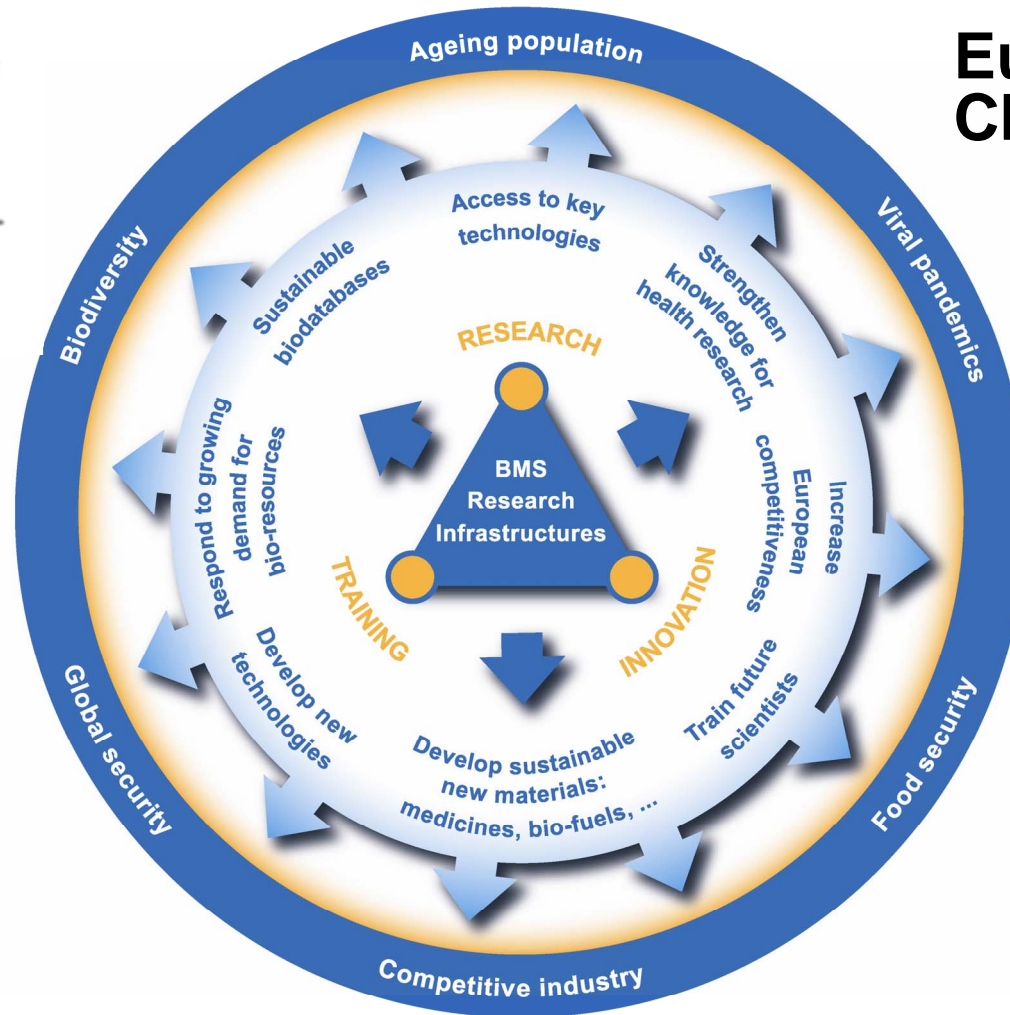
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Europe Grand Challenges



The EMBRC community will generate knowledge to address such major societal challenges as Climate change, Biodiversity loss and Securing the provision of food, bio-materials and bio-energy from the marine ecosystems.

General impacts of pan-European Research Infrastructures (BMS position paper on Horizon 2020).

Providing cutting-edge technology platforms for academia and industry

Reducing fragmentation and promoting efficiency through benchmarking and harmonization

Providing education and training to researchers and staff

Delivering synergies and highly interoperable research processes

Enabling researchers to find new solutions to meet major societal challenges

Rapidly translating findings from basic science to new applications

Attracting and retaining world-leading scientists

How does this translate for EMBRC and the peripheral maritime regions

Many peripheral maritime regions already significantly support the construction and the operation of the EMBRC institutes on their territories.

The added value of joining a pan-European alliance includes :

- higher visibility and attractivity**
- higher benchmarking stringency, hence funding efficiency**
- expansion of collaborations in research, higher education and innovation**
- increased inter-regional and inter-national cooperation, including with non - European regions (decentralized cooperation).**

All of this would be major consolidations for a « smart specialisation » of their maritime economies.

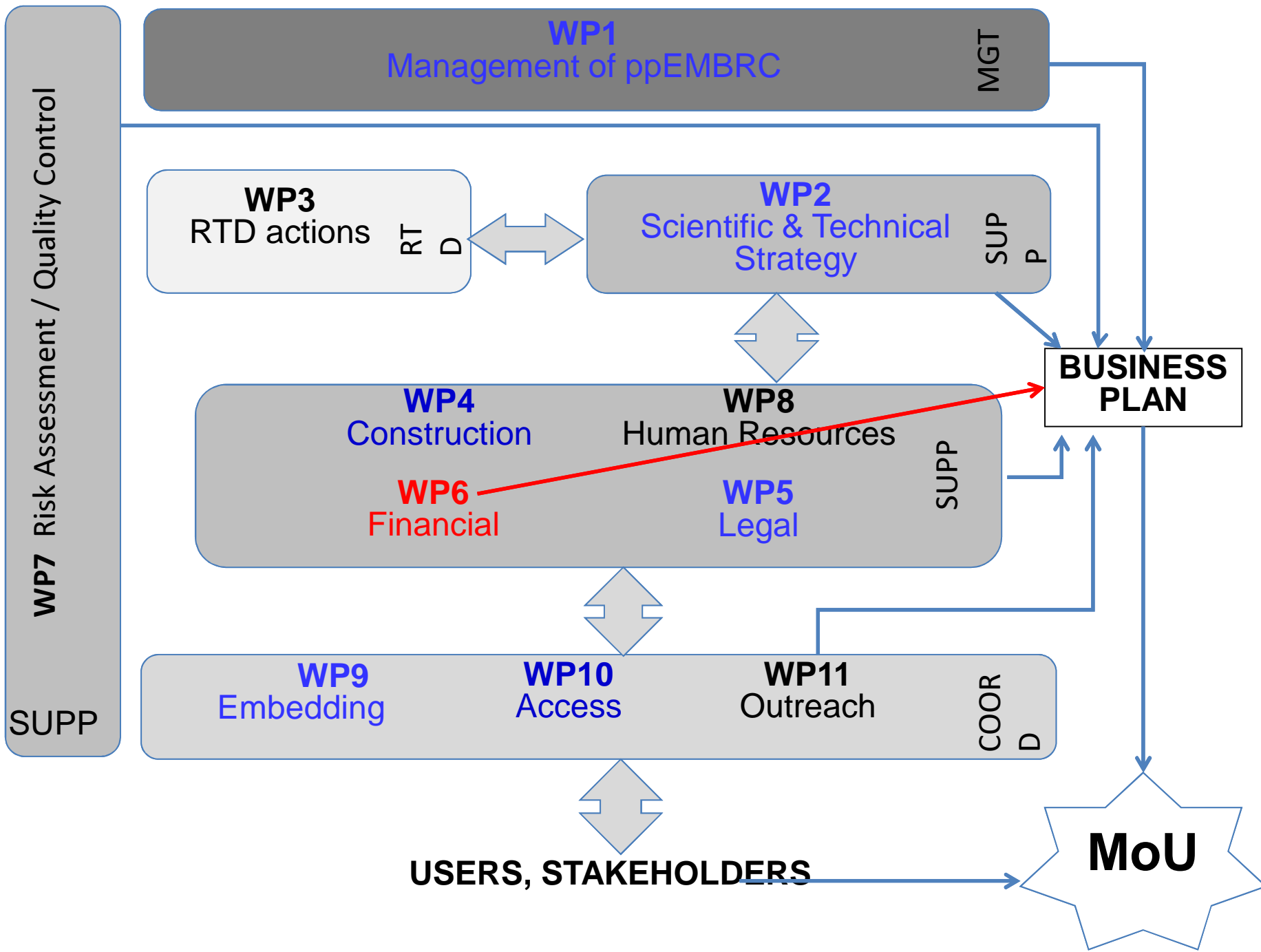
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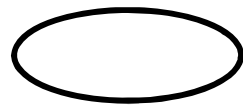
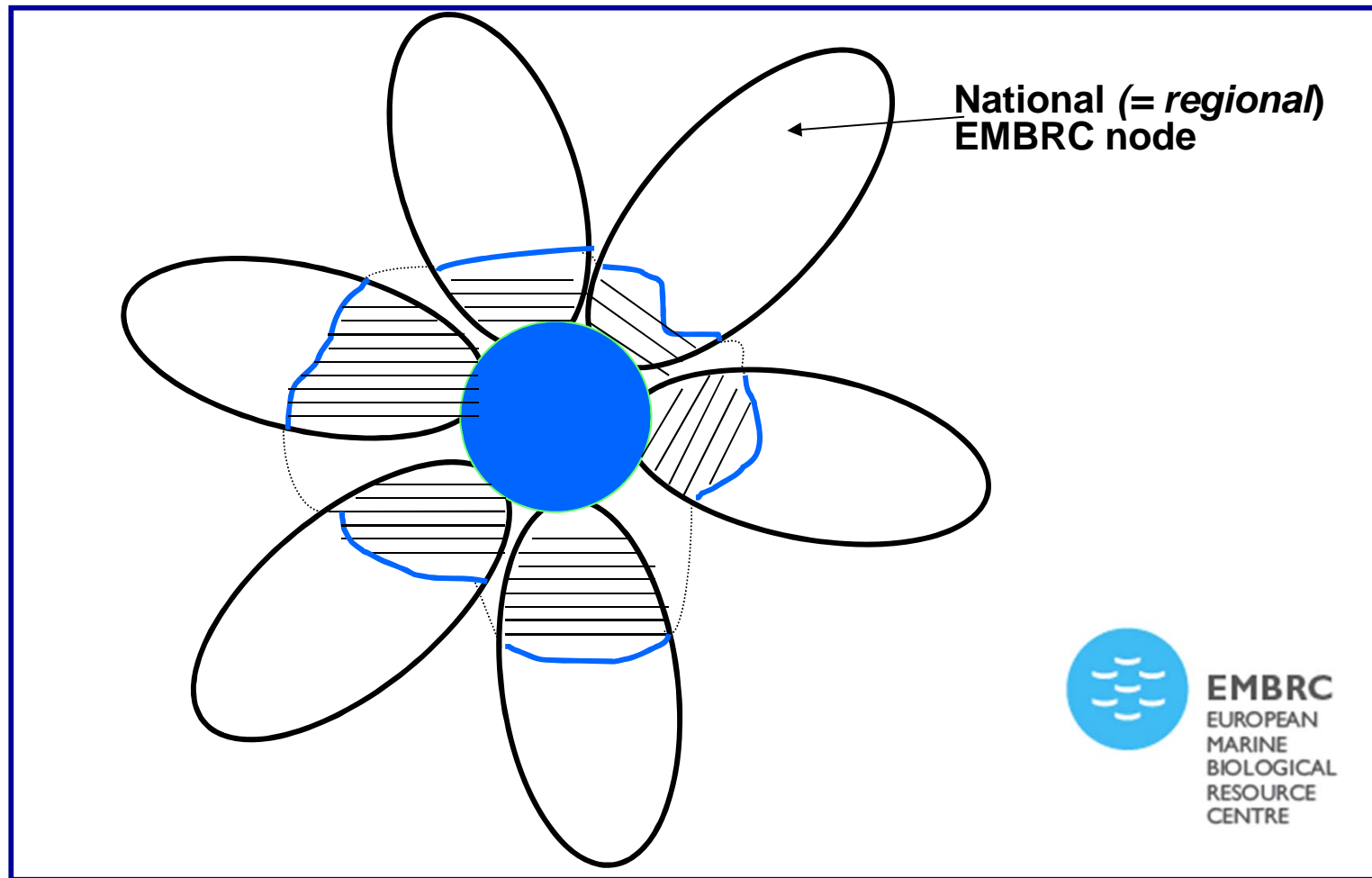
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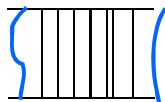
Needs now.

EMBRC is competing for national resources (funds, positions, general support from the research operators...) with other RIs which are closer to the largest knowledge centers (central vs peripheral) and to powerful lobbies in other (non-marine) areas of sciences.

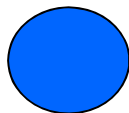
We need political support from the CPMRs to get EMBRC off the ground, i.e., have it formally endorsed in the national road maps and see to its real implementation at the end of the preparatory phase.



Nationally owned research activities



Nationally owned services, yet formally open for access under the EMBRC umbrella



EMBRC pan-European core

The variety of functional elements in EMBRC: the « lily model »

Management and maintenance of EMBRC: national vs pan-European subsidiarity.

**Maintain and develop the infrastructure nodes,
including with capital investments.**

**Maintain, update and staff the platforms and the
other services under access.**

**Management and promotion of EMBRC:
networking activities, outreach and
communication, training of staff and users,
knowledge transfer to various stakeholders**

**Organization of access calls and governance
meetings, running costs for the central core staff**

**Joint technological development activities, e.g., to
continuously improve our offer of models and
competencies in marine genomics**

...

Potential financial stakeholders in EMBRC

At the member-state level :

Governments and their ministries (Research, Environment, Industry...)

Research councils and funding agencies

Research operators, including research organizations and universities

Regional and local governing bodies

At the European level

The European Commission and the European Parliament

At the international level.

United nations organizations (e.g., UNESCO, FAO)

As well as private companies, foundations, NGOs....

Needs at further stages

From the very beginning of the EMBRC preparatory phase, various CPMRs have expressed interest in the merging of their marine institutes into EMBRC.

We believe that the benefits of being together are so high that the regions should not only contribute to the excellence of their own institutes but also financially support the operation of the EMBRC central core (together with Members States and the European Commission)

With this view, CPMRs should take responsibilities in the governance of EMBRC.