General Assembly 2017 minutes

University of Algarve, Penha Campus
Faro, Portugal

September 11th-12th

HORIZON 2020 - INFRADEV
Implementation and operation of cross-cutting services and solutions for clusters of ESFRI

The General Assembly (GA) is the meeting of all partners of the consortium. EMBRIC's 2017 GA was chaired by the coordinator institution (UPMC) and hosted by partner 2, Centro De Ciencias Do Mar Do Algarve (CMAR) in the dates agreed during the 1st Executive Board (EB) meeting (May 5th, 2016). During this GA, the progress and results and the difficulties of each WP were communicated to all participants and discussed. Following the GA, the Advisory Board (AB) and EB meeting took place.

Representatives of external projects to EMBRIC, such as the sister PharmaSea, MaCuMBA or SeaBiotech, and stakeholders of renowned leadership in the marine biotechnology domain, ERA-NET Marine Biotech, Euromarine, and Bio-Based Industry Consortium were also present.

The agenda of the GA is found in Annex 1. The participant attendance list can be found in Annex 2. All presentations can be found in the EMBRIC website: http://www.embric.eu/node/811

Minutes:

Day 1: Tuesday, September 12th

Blue bioeconomy and peripheral maritime regions – Ricardo Miguéis (Technological and International Programmes, ANI):

- Blue economy relevance in terms of economic value and job creation is comparable in Portugal and Europe.
- The Portuguese national strategies (2012 and 2017) are based on European directives
- Blue economy is relevant to all Portuguese regions and is listed in their priorities.
- European fisheries and maritime fund is <5%, regional development fund.
- Investment instruments: EIB (>4M€), H2020, COSME, LIFE, etc., State budget, cofounding programs academia-companies in international value chains.
- Main challenges identified by key stakeholders:
    - Improve the capacity of traditional sectors and the launching of new emergent knowledge-based areas into business;
    - Make the most of regional and national capacities and integrating value chains at international level;
    - Creation of new policies and instruments for a post-2020 era.

Blue growth and Horizon 2020 projects – Adrianna Ianora (SZN)

- Presentation about book chapter in Springer series: Grand Challenges in Marine Biotechnology, a review of significant progress and cutting-edge discoveries.
- Book highlights:
    - Discusses the promise of marine biotechnology in the 21st Century;
    - Explores the economic potential of marine biotechnology;
    - Reviews recent advances and identifies challenges in reaching this potential.

- Author of Chapter 11: Overview of Recent EU-Funded Projects
- Focus on marine and fresh-water biotechnology (blue biotechnology) projects and on few ongoing projects funded under the topic "Blue growth" of H2020.
- There is now a strong momentum to drive progress in European Marine Biotechnology, especially for pre-clinical and clinical development of new compound leads.

Tunatech – Christopher Bridges (Tunatech)

- Industry: Tuna farming (Bluefin Tuna, BFT, *Thunnus thynnus*) and related products
- Spawning techniques and enhanced live feed (copepods).
- Long-standing involvement in several EU projects DOTT, REPRODOTT, ALLOTUNA, SELFDOTT and TRANSDOTT aimed at domestication of the Bluefin Tuna.
- First European reproduction successes of captive Bluefin Tuna within these projects (2005) and multiannual proof of concept by TunaTech.
- Tunatech value proposition:
    - Sustainable aquaculture techniques for high priced species (BFT, YFT, Salmon Restocking, Sturgeon Gender, Amberjack) by commercialization of research results and acquired knowledge;
    - Products and services → Improvement of the aquaculture industry with Tunatech's products and techniques.
        - Spawning induction and synchronization
        - Molecular biological DNA analyses (e.g. Paternity-test, Sex-test, Inbreeding-test, Species-test)
        - Healthcare improving and reduced water pollution (disinfection agents)
        - Biotechnical engineered fish feed and additives
        - Valorisation of aquaculture waste products
    - Consulting and research → Advice and Consultation for (tuna) fisheries and aquaculture projects.

WP8 – Ian Johnston (USTAN)

- Highlighted results:
    - Survey of wild King scallops in different locations in Europe to identify genetic differences between regions and large allele frequency differences indicative of natural selection;
    - Breeding fish for better feed efficiency: Set up a protocol for phenotyping fish for their individual feed efficiency and estimating the genetic parameters using genomic data;
    - Standardizing genome sequencing, assembly and annotation processes with BTF.
- Interactions within the WP were reported below expectations (with exceptions).
- The low partner attendance at the General Assembly was disappointing.
- The SMEs could facilitate an access application. However, the small-scale projects don't fit well with this WP. It would also help if the full range of AquaExcel partners were included in the pilot access.

- WP8 is a case study developing infrastructure capacities and it does not have a companion WP defining the offering unlike the natural product discovery case studies. This is a problem for attracting users unless an attractive offering is developed.

WP7 – Mariella Ferrante (SZN)

- Task 7.1: Natural products from microalgal strains
  - Pipeline: Pellets from 65 samples → 380 Extracts → metabolomics and bioassays
    - Bioassays on extracts from different microalgal strains were carried out
    - The "Metabolomic fingerprint" was used to find extracts with high concentration of compounds.
  - Molecular networking: network analysis linking molecular compounds and samples grown in different conditions was performed to identify the best condition to obtain a given compound.
- 7. 2: Genomics resources and toolboxes for strain improvement
  - Two research activities:
    a) *Ostreococcus*, *Phaeodactylum* and *Pseudonitzschia arenysensis* are used as model species to knock out genes.
    b) Induce sexual reproduction for selective breeding.
  - Bottleneck: scaling up for production of sufficient biomass.
- WP7 offer: extracts, metabolic profiles, bioassays, expertise and access to microalgal cultures, genetic engineering tools.
- The visibility of the pipeline could be improved by including it in the next TA call and through the EMBRIC website.
- Interaction with other WPs: 4 meetings with WP4, WP6 and a workshop forecasted for 2018.

WP6 – Rebecca Goss (USTAN), in representation of D. Smith
Highlighted outcomes by partner:

- DSMZ
  - Biomass production;
  - Fermentation and extraction scale up of the 20 selected strains;
  - Techniques for improved targeted isolation and characterization.
- USTAN
  - Genome reading to determine biosynthetic gene clusters (BGCs);
  - Comparing approaches to unlocking natural product biosynthesis using: Chemical elicitors (rapid but untargeted) and heterologous expression (cosmid and bac libaries).
  - LC-MSMS, HNMR, CNMR, HSQC, NOESY- characterization.
- HZI
  - Characterize the metabolome by untargeted GC/MS and LC/MS.
  - Correlate metabolism with gene expression data (for few selected strains).
  - Test efficiency of different extraction and characterisation techniques.

- Test extracts and pure compounds in cellular bioassays (in alignment with WP7).
- For bioactive compounds: Mode of action studies, peptides arrays, mutant generation and sequencing.

- CABI
  - Overview of legal framework.
  - Network road map: Environment to molecule.
  - Report on prototype workflows from the microbial resource to product discovery.

Work to project end:

- Improved cultivation conditions of the EMBRIC strains in progress (3 well advanced, 17 to process) → DSMZ;
- Different routes to access the encoded biosynthetic clusters are being explored (e.g. Gibson assembly, cosmid library generation and probing) to the metabolites → USTAN;
- Characterize samples from DSMZ workflows, detect components for isolation and full structural characterization, biological pre-profiling of extract libraries, in-depth biological profiling of isolated secondary metabolites, refinement of analytical pipeline (removal of bottlenecks) → HZI.

Joint European Marine Board & ERA-NET Marine Biotech Policy Brief – Steinar Bergseth (ERA-MBT, Research Council of Norway)

- EMB policy brief provides a high-level summary of the key research needs and priorities on topics of strategic and emerging importance in seas and ocean science from a European perspective.
- The policy brief underlines the need of infrastructures in marine biology, life sciences and other scientific domains for the correct development of marine biotechnology.
- Challenges in marine biotechnology:
  - Develop simplified access for sampling, analysis and screening;
  - Establish trans-disciplinary self-sustained marine biotechnology research and innovation networks;
  - Operationalize trans-national access to key infrastructures and facilities (including industry);
  - Strengthen marine graduate training across the value chain.
- Marine regions play an important role for the blue bioeconomy development.

Euromarine – Nicolas Pade (UPMC)

- The strategy is to have bottom-up inclusiveness.
- Only long-term self-sustained scientific network in marine biology (10+ years).
- Find new ideas (emerging scientific topics & associated methodology) and support anything scientific community is interested in developing.
- Training Working Groups together with European Marine Board and JPI Oceans.
- Participation in international stakeholder events, e.g. EU Parliament event 2017.

- Interested in keeping broad calls, making no difference between marine and terrestrial biology.
- Invitation to participate in New Era of Blue Marine Enlightenment, Euromarine's side event. The objectives being to identify collaborations and opportunities for ocean research available within the network and to provide an example of a network model that could be extended to other regions.

Day 2: Wednesday, September 13th

WP2 outcomes – Adelino Canario (CCMAR)

- Programmatic interface - queries databases and returns desired information (mapped dataset) (EBI/Elixir)
- Microalgae collections:
    - Identify and describe use cases (Nov 2017)
    - Workshop Cambridge between technical people that produce programmatic interface and use case leaders (Jan 2018)
    - Interesting outputs will be tested in the lab and serve as demonstration, e.g. publication/patent
- Key outcomes of 4 workshops that were held up to now were mentioned. A review paper is planned to be produced from the workshop outcomes.
- Cultivation of macroorganisms and ethical issues Workshop upcoming next year.
- Publication of standards and harmonization in the pipeline.
- A workshop for harmonizing procedures to access will be organized next year (biological passport)

The future ISO standard for management systems and quality of biobanks – Marleen Bosschaerts (Belgian Science Policy Office)

- Review of ISOs in timeframe.
- First standard dedicated to biobanks ISO20387. Chapter 6 is devoted to financial viability and sustainability.
- Importance of Quality Management Systems to improve compliance, organisational culture and documentation.
- Different types of standards (formal standards, consortia standards, de facto standards)
- Pro standards: "common language" & Contra standards: "limits creativity":Hence, balance has to be found.
- ISO 20387 as the first standard dedicated to biobanks.

WP3 – Philip Gribbon (FVB)

- Aim to improve harvesting and cultivation of marine organisms.
- Deliverable to identify existing capabilities and activities within EMBRIC were mapped and analyzed how they fit user needs.

- David Smith has mapped centres of expertise and best practices (Deliverable 3.1)
- Strategies to overcome identified bottlenecks has been written and paper inspired in this deliverable will be published soon.

- Discovery Pipelines:
  - 3 pipelines that assemble existing capabilities into coherent service-oriented workflows to allow discovery of natural products and biomolecules:

i) drug discovery pipeline (secondary metabolite and small molecule)

➔ In close collaboration with WPs 6 and 7

➔ Will be included in the Transitional Access call

ii) protein discovery pipeline

➔ Development of a protein platform that connects EMBRIC protein-expert partners

➔ Will be included in the Transitional Access call

iii) carbohydrate discovery pipeline (the hardest task so far due to few carbohydrate drugs on the market)

- Creation of an on-line interface that allows the user to contact pipeline experts in collaboration with WP9;
- Deliverable 3.2 will present the implementation plan for the discovery pipelines for marine products.

WP4 – Guy Cochrane (EBI)

- Objective: implement sustainable data management services
- Task 4.1: Configurator
  - The Configurator service available at www.goo.gl/u4hEJo
  - 5 current use cases in collaboration with Aquaexcel. There is a need for more uses cases to develop the Configurator.
  - More people should be recruited into the panel of experts to advice on cases that come through the Configurator.
  - Deliverable D4.2 has been submitted.
- Task 4.2: Chemical data warehouse
  - A data warehouse has been developed to link genomics data with data in ELIXIR chemical resources.
  - SQLite database with tables linking chemical data in ChEBI, protein data in UniProt, chemical information in ChEMBL and sequence and genome assembly information in ENA.
  - Available to download from ENA public ftp site and we offer support to use this: ftp://ftp.ebi.ac.uk/pub/databases/ena/collaboration/embricDB_v1.tar.gz
  - Deliverable D4.3 submitted in month 24
  - About data warehouse interface development:
    - Ian Probert will lead on collecting use cases from WP2, WP7 and others
    - A "Hackathon" will be organized in January 2018 to explore use cases and define interface requirements.
  - Interface Options:

        - Underlying Data Resources
        - Marine Metagenomics Portal (MMP at University of Tromsø offering an online service.
        - BacDive at Leibniz-DSMZ
    - Future improvements of the data warehouse:
        - Increase mappings within the current databases.
        - Expand the number of databases that can be mapped.
        - Further explore the use of strain data to link to culture collections and to the literature to facilitate data integration across small molecules, culture collections and genomics databases.
  - Task 4.3: Marine data standards
    - Contextual data checklist for a molecular sample from strains in collections and shellfish:
        - mapping between past EU projects (EMbaRC, GSC MIxS, Micro-B3, M2B3)
        - Deliverable 4.1 submitted in month 18.
- Training (with WP9):
    - Application submitted to WP9 call to run a genomics-centric training course.
    - A second application is under preparation to run a metabolomics data submission and access course with Metabolights data resource.

WP5 – Pierre Colas (SBR)

- Task 5.1; Analysing the biotechnology Regional research driven clusters (RRDC)
    - build activity profiles for profiling centres.
    - analysis of training
- Task5.2: Creating a community of practice in technology transfer between EMBRIC RIs developed an analytical network
    - Survey: important to develop collaborative and trust based networks ('bonding') between TT personnel, researchers, industry actors and investors. Have to run this as a shared project.
    - Vital to develop procedures for TT that are flexible and adaptable to specific challenges
    - TT is a learning process.
    - Talk to WPs 6,7,8 to about tech transfer challenges
- Task 3:
    - To be started 2018
    - Objectives:
        - Identify challenges and bottlenecks.
        - Characterize socio-economic impacts.
- Interactions outside the project:
    - PROGRESS_TT (European project developing TT tools, methods and insights
    - Euromarine
    - INKREASE (Interrreg project)

WP9 – Thibaud Mascart (UGENT)

- The general objective is to homogenize standards in training and implement knowledge transfer activities to raise awareness of the need of transfer excellence in science into applications in industry. The implication of policymakers and industry into this matter is essential.
- 1st training call evaluation (following the review of EMBRIC): new evaluation criteria is proposed:

New criteria	Old criteria
Open it to all RI partners	Only for internal partners
Dissemination to all networks	Only internal dissemination
Minimum 1 EMBRIC partners	Minimum 2
Other tools/solution	Only face-to-face workshops
–	Currents costs
Maximum 5000€	Maximum 3500€

WP10 – Wiebe Kooistra (SZN)

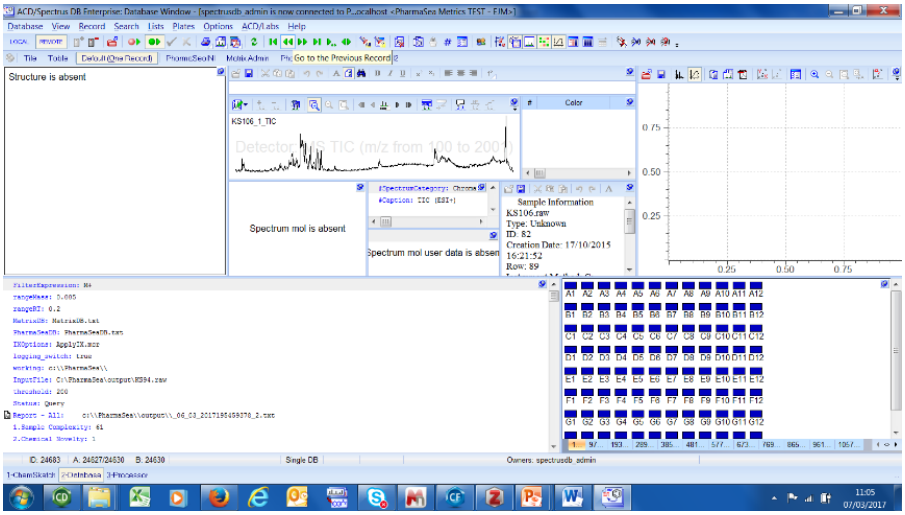
- Presented a review of the results of the 1st TA call:
  - Access budget: 350K€, used 90K€
  - Travel budget: 232K€, used 80K€
  - 12 applications received, 10 funded
  - Technical feasibility check and Scientific review in parallel to save time
  - Each USP member evaluated all proposals to treat all proposals equal
- The budget for the 2nd round of access:
  - Residual budget €153,760 for the users travel and accommodations; €260,400 for the access providers
  - 1250-320=930 units of access.
  - Unit of access, up to 280€ user /working days
- Modifications to the 2nd TA call:
  - 800 access units to deliver
  - Extend to 3 weeks in each Access Provider
  - Invitation to other EMBRIC beneficiaries to participate to the TA call
  - Need to attract interest from industry
  - Avoid use of single contract
  - New service categories
  - Presentation of EMBRIC Pipelines
  - Access provider can only be representing a single RI
- Dissemination: Need support of all EMBRIC partners for best results

WP1 – Fanny Schultz and Mery Piña (UPMC)

- Results of mid-term review. To be improved: communication, interaction with industry and policymakers, training offer and deliverable revision.
- All deliverables up to date and available online.
- For communication and dissemination, Biocom will be supporting WP1. Laura Griestop is the contact at Biocom for EMBRIC.
- Laura will take care of the EMBRIC newsletter, published once a month. She will contact people to have information for communication.
- Closing event for EMBRIC: Organization of a pitch in collaboration with WP5. Companies related to marine biotech will be presented.

Pharmasea – Meredith Lloyd-Evans (Biobridge)

- Identified bottlenecks for improving quality, vlume and value of agents discovered in mthe marine environment to reach the market:
    - Legal and physical access
    - Isolation and identification of chemical talent
    - Determination of the chemical novelty
    - Determination of bioactivity
    - Scale-up and knowledge transfer
- Legacy collection of microbes and sponges
- Microalgae cultured in different conditions at SZN
- LIMS: lab information management system (Janette Anderson, UiT): repository of all information from isolation to biological activity. Using unique identifier for ID of extracts and microorganisms
- OpenNAPIS: lab information management system, open access
- Dereplication of >600 extract by DTU, UNIABDN and MEDINA
- Epilepsy drug discovery, based on zebrafish model
- UNIABDN and ACD Labs for dereplication software



- Policy interaction WP6: inform policy, +20 meetings with UN, proposing pragmatic solutions, best practice guidelines, statements on legacy.
- Connection with Eurofleets

SeaBioTech – John Day (SAMS)

- 7 SMEs (some expert in screening for bioactivity)
- Sampling from extreme environments
- Bact-algae, not axenic culture
- Taxonomic data unanalysed from all EU prospecting projects.
- Prospects for products: carotenoids, carbohydrates, antibiotics, anti-diabetes, lipases, among others
- Legacy: Strathclyde central repository of data and samples, see presentation for contacts.

MaCuMBA – Lucas Stal (NIOZ Royal Netherlands Institute for Sea Research)

- 10 objectives: improve isolation, cultivation, production, understanding of cell-cell communication, among others
- Microdish: Thousands of compartments for growing microbes. Not commercially available yet because of cost.
- Industry-Academia meeting (not successful in attracting politicians and industry).
- Results: Marine Microbiome book (springer)
- Legacy brochure available at the MACUMBA website

A joint effort by the MBT and COFASP ERA-NETs and JPI-Oceans for the Blue Bioeconomy – Steinar Bergseth (ERA-MBT, RCN)

- Initiators: COFASP, ERA-NET MBT and JPI Oceans
- The project answers to strategic area of JPI: food security and use of Use of Marine Biological Resources through Development and Application of Biotechnology
- The project will be relevant for policies and agendas of the EC
- The cofund will address:
    - New aquatic bioresources (marine & freshwater)
    - New uses of traditional blue bioresources
    - Improvement of existing value chains, incl. circular economy
    - Cross-cutting and supportive issues
- Interested partners, contact Tom Redd: TRE@RCN.no

Round table – RI coordinators, moderator: Adrianna Ianora (SZN)

- Diversity of content among different European projects
- Projects should team up with long term infrastructures which could help maintain their legacy.

- The EOSC could be relevant for maintaining legacy.
- Human frontiers to sustain ELIXIR core services.
- MicroB3 had standards, datasets, conventions that are used now EMODnet.
- Funding innovation (EC) is different from funding long term sustainability (keep things running, infrastructures, funding by member states).
- The relevance of RI clusters is to create research clubs that have complementary activities
- Can an RI cluster generate job creation?
- WS on pre-clinical and clinical needs, example “IMI” bioactives, from Euromarine => they maintain the community to organize WS, interaction, lobbying.
- Different DGs and other stakeholders are interested and support Blue Growth: DG R&I, DG MARE, DG EASME, INTERREG…