

ELIXIR: A DISTRIBUTED LIFE SCIENCES INFRASTRUCTURE SUPPORTING INNOVATION IN MARINE SCIENCES

Andrew Smith¹, Nils-Peder Willassen² and Dag Inge Våge³

¹ ELIXIR Hub, EMBL-EBI, Wellcome Trust Genome Campus, Hinxton, Cambridge, CB10 1SD, UK
E-mail: asmith@ebi.ac.uk

² University of Tromsø, Faculty of Science and Technology, NO-9037 Tromsø, Norway
E-mail: nils-peder.willassen@uit.no

³ Norwegian University of Life Sciences (UMB), Centre for Integrative Genetics (CIGENE), Dept of Animal and Aquacultural Sciences (IHA), PO Box 5003, N-1432 Ås, Norway
E-mail: daginve.vage@umb.no

ELIXIR is a distributed Research Infrastructure for the life sciences. It will ensure that researchers throughout Europe have access to the biological data they need to address pressing challenges in marine science, from the loss of biodiversity to food safety and security. These are issues of such complexity that no one institute, company, country or continent can tackle alone.

ELIXIR harnesses and builds upon Europe's strengths in bioinformatics. The central co-ordinating Hub is based alongside EMBL-EBI on the Wellcome Trust Genome Campus in Hinxton, UK, with nodes distributed throughout centres of excellence in the participating member states. At present, EMBL and the following fifteen countries are ELIXIR members: Czech Republic, Denmark, Estonia, Finland, Greece, Italy, Israel, Netherlands, Norway, Portugal, Slovenia, Sweden, Spain, Switzerland and the UK.

Discoveries in marine sciences increasingly involve computational methods. These range from aquaculture to using marine natural products for pharmaceutical development through to the monitoring of pollution, and have great potential for improving quality of life and environmental protection. Equally, these are also disciplines where European industry can thrive, helping to drive competitiveness, employment and growth.

The Norwegian ELIXIR Nodeⁱ will provide services and resources toward marine genomics including researchers, government, and industry. The Norwegian Node will offer several integrated packages geared towards large-scale analysis of marine genomic and metagenomic data (e.g. fish genomics and marine bioprospecting). This also includes provision of web-based solutions for services, toolboxes, and computational access to reference data provided by the ELIXIR infrastructure.

Researchers in academia and industry already make great use of existing bioinformatics resources to carry out marine research: in addition to leading services provided by the Norwegian ELIXIR Node, other services run by ELIXIR partners include the European Nucleotide Archive (ENAⁱⁱ) and UniProtⁱⁱⁱ, which have many sequences from marine species, and Ensembl genomes, which includes genomes from some marine organisms. Additionally, there are also a number of marine metagenomics datasets on the European Bioinformatics Institute's metagenomics portal^{iv}.

The BioMedBridges^v project, which is coordinated by ELIXIR, is building connections between ELIXIR and the other ESFRI Research Infrastructures including the European Marine Biological Resource Centre (EMBRC)^{vi}, with links to metagenomics data that will help characterise poorly understood ecosystems and to cheminformatics data to characterise the activity of isolated natural products.

ELIXIR can act as the resource to store marine-based biological data generated through nationally-funded research projects as well as through European programmes such as the Joint Programming Initiatives. Research projects funded through the JPI Oceans initiative are likely to generate large amounts of relevant data, which can be preserved, annotated and made available for further use by the ELIXIR infrastructure, ensuring maximum value for taxpayers.

ⁱ <http://www.bioinfo.no/>

ⁱⁱ <http://www.ebi.ac.uk/ena/>

ⁱⁱⁱ <http://www.uniprot.org/>

^{iv} <https://www.ebi.ac.uk/metagenomics/>

^v <http://www.biomedbridges.eu>

^{vi} <http://www.embrc.eu>