

# International collaborations create chemistry

## Case study: PHARMASEA

Professor Marcel Jaspars built an international collaboration, using €9.47m FP7 funding, to find treatments for conditions such as Alzheimer's disease and epilepsy from marine invertebrates, bacteria and fungi, typically in deep sea and cold environments such as the Arctic, Antarctic and deep-water trenches.

Professor Marcel Jaspars' team at Aberdeen University worked with both industry and academic partners across 24 institutions in 14 countries on a project funded by the final round of the EU's Framework Programme 7 (FP7), finishing in March 2017. "The international nature of the project group brought together complementary skills in specialist areas of science, policy, administration and publicity, so it ended up working really well."

### A pipeline of international partnerships

PHARMASEA succeeded in developing a robust pipeline to process marine microbial genomes from newly collected and existing strains.

Marcel explains: "We had everything from the beginning to the end of a drug discovery project, so we decided to treat things as a pipeline. We had groups in Ireland, Norway and Italy with expertise in isolating bacteria, then colleagues in Spain, Norway, China and Costa Rica building the extract libraries. Next was the biological screening of the libraries: this was done in Belgium, Spain and Norway. We had scale-up and downstream testing which was done in Austria and Spain."

### Shaping global policy

The biggest success Marcel's team didn't foresee was with United Nations (UN) policy. "60% of oceans are not covered by international laws to protect marine biodiversity. Our work showed what the commercial value might be of this deep-sea biodiversity." PHARMASEA started working with the UN in 2014 to present the scientific aspects of a potential legal framework

protecting marine biodiversity in international waters, and their policy suggestions can still be seen in the latest draft of the framework.

Although that work has been delayed due to COVID-19, it has opened the door to other opportunities. "A spin-off of the UN work has been an invitation to write a paper on digital sequence information with the UN Convention on Biodiversity. We also attended a meeting of the High-Level Panel for Sustainable Ocean Economy [an initiative of 14 serving world-leaders] and a "sprint" meeting with the UN Global Compact. All of these things are long-term, but they came from the PHARMASEA project itself and the PHARMASEA brand turned out to be a very powerful thing."



**Project:** PHARMASEA

**Project lead:** Professor Marcel Jaspars, University of Aberdeen

**Funding:** Framework Programme 7

The world's oceans have huge potential for the harvesting of unique chemical compounds but remain relatively unexplored. PHARMASEA set out to release some of these bioresources by tackling the barriers to their exploitation. PHARMASEA's project partners have filed two patents, with a third in process, and generated over 100 publications. Of the patents, the first is for an anti-Alzheimer's series of compounds derived from those discovered in the project, which are now in development. The second patent covers an anti-epilepsy series of compounds and describes a new drug prototype that KU Leuven is taking forward. Marcel says: "Scientifically, to be part of patents that could prove useful is fantastic."

### Training the next generation of biodiscovery scientists

Members of the PHARMASEA consortium also went on to win a further €3.21m Horizon 2020 funding for two follow-on projects: [MarPipe](#) and [Ocean Medicines](#). MarPipe trained 11 PhD students and has helped ensure the next generation of marine biodiscovery scientists are conversant in the legal, policy, innovation and entrepreneurial potential of their research. Ocean Medicines created a network of scientists from academia and SMEs across Europe to further develop lead compounds from the marine microorganisms already identified by PHARMASEA.

### Collaboration after EU exit

Marcel has continued to be invited to participate in EU scientific advisory boards since the UK left the EU, with interest in his expertise increasing. Although potential research partners "were pretty honest about not wanting to work with UK scientists because of the risks towards the end of Horizon 2020", in Marcel's experience it is no longer "perceived as a major issue – [partners] are looking for people with the right skills".

Marcel concludes: "For me it has been hugely positive to have friends all around Europe and to have them include me in their projects. It has given me the reputation of a person who can run a very large project well. I learnt to deal with some very difficult situations throughout the project, so it was a great learning curve for me personally."

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