AMYLOVIS - Capacity building for the treatment of neurodegenerative diseases

PARTNERSHIP

Background

Dementia is one of the main causes of disability and dependency among the elderly, and in particular, Alzheimer's disease (AD). To this end, the World Health Organization (WHO) has recognised dementia as a public health priority. Cuba has an ageing population that will be the oldest in the region by 2025, and thus presents the highest risk of suffering from these neurodegenerative diseases. Cuba, Mexico and France (a country with a significant elderly population) have institutions dedicated to the study of neuroscience related to ageing.

CNEURO is a centre of excellence in the training of personnel on the topic, and has developed in vivo induced models of AD for the evaluation of therapeutic agents. CNEURO has extensive experience in the organisation of conferences, seminars and workshops, in the training of qualified personnel, and in the execution of national and international projects. This project is partially funded by the National Neuroscience and Neurotechnology Program, in the amount of 22 million Cuban pesos.

In Europe, the MMDN is a leader in the field of ageing mechanisms and neurodegenerative diseases, boasting state-of-the-art equipment for the study of these diseases.

In turn, the INB is a training centre for neuroscience specialists, with a multifunctional experimental and professional platform capable of incorporating new techniques.

CNEURO has worked closely with the INB since 2017 on a non-profit basis, through scientific partnership agreements aimed at developing treatments for AD. As a result, their technical, material and human resource capacities have been strengthened. Through this collaboration, it has been possible to publish scientific articles in specialised journals, present papers at scientific events, and provide training for scientific and professional staff. In addition, CNEURO has continued a project agreement 'Hubert Curien / Carlos J. Finlay' with the MMDM, a non-profit organisation for professional training and development in the field of neuroscience, focused on therapeutic prospects for AD with an innovative multi-target effect directed at neuroinflammation. The two entities also jointly presented a paper at an international scientific conference.

Entities and roles

BENEFICIARY ENTITIES

Instituto de Neurobiología de Querétaro (UNAM)

Mexico

FIRST PROVIDER ENTITIES

BioCubaFarma - Centro de Neurociencias de Cuba

Cuba

SECOND PROVIDER ENTITIES

Mécanismes Moléculaires dans les Démences Neurodégénératives (MMDN)

France

Development challenges

The specific challenges are:

- Increase the scientific-technical expertise of staff based on new developments in the mechanism of neurodegeneration in AD.
- Increase the number of staff able to work with β-amyloid peptide overexpression models for the evaluation of potential therapeutic agents for AD.
- Increase the number of staff able to identify the mechanisms of action of the compounds evaluated in the sigma 1 receptor.
- Increase the number of personnel capable of efficiently managing bioinformatics techniques.

- Promote the training of young specialists through the presentation of dissertations and theses.

PROJECT

The objective of this Triangular Cooperation project is to promote capacity building for the transfer of knowledge related to effective therapies for neurodegenerative diseases.

Triangular approach

This project aims to promote the replication of processes through professional training in the study of neurodegenerative diseases affecting the elderly population in developing countries in Latin America. To this end, the experience of French experts, researchers and scientific staff will facilitate the transfer of knowledge on issues related to the development of technologies for the treatment of these diseases, which can lead to innovative and globally applicable products. All of the professional training provided will help promote the training of new professionals. CNEURO has traditionally collaborated bilaterally with INB and MMDM, but a triangular exchange will enhance staff training and innovation capacities.

CNEURO will lend its expertise in managing the in silico, in vitro and in vivo evaluation of potential neuroprotective agents for AD. To this end, it has qualified personnel in the fields of chemistry, pharmacy, biochemistry and radiochemistry, with expertise in the field of neuroscience. It also has a bioinformatics group capable of training other professionals in advanced molecular screening techniques. The cellular and molecular biology laboratory has basic equipment for the development of experimental work and the infrastructure for teaching classes. There is also a small animal research facility and an animal behaviour laboratory, where the learning and memory capacity of mice is studied, along with other tests to measure animal motor skills.

INB has an in vivo evaluation platform in animal models of neuroinflammation, as well as in vitro evaluation capabilities for potential therapeutic agents.

MMDM will provide guidance on the training of new scientific personnel who can transfer their expertise to other professionals. It is staffed by leading experts in the field and is equipped with state-of-the-art technology. It also has extensive experience in the organisation and implementation of workshops, seminars and conferences. In addition, MMDN will contribute to monitoring the progress of the project objectives and expected results.

Sectoral approach - Contribution to the 2030 Agenda

PRIMARY SDG

Goal 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

SECONDARY SDG

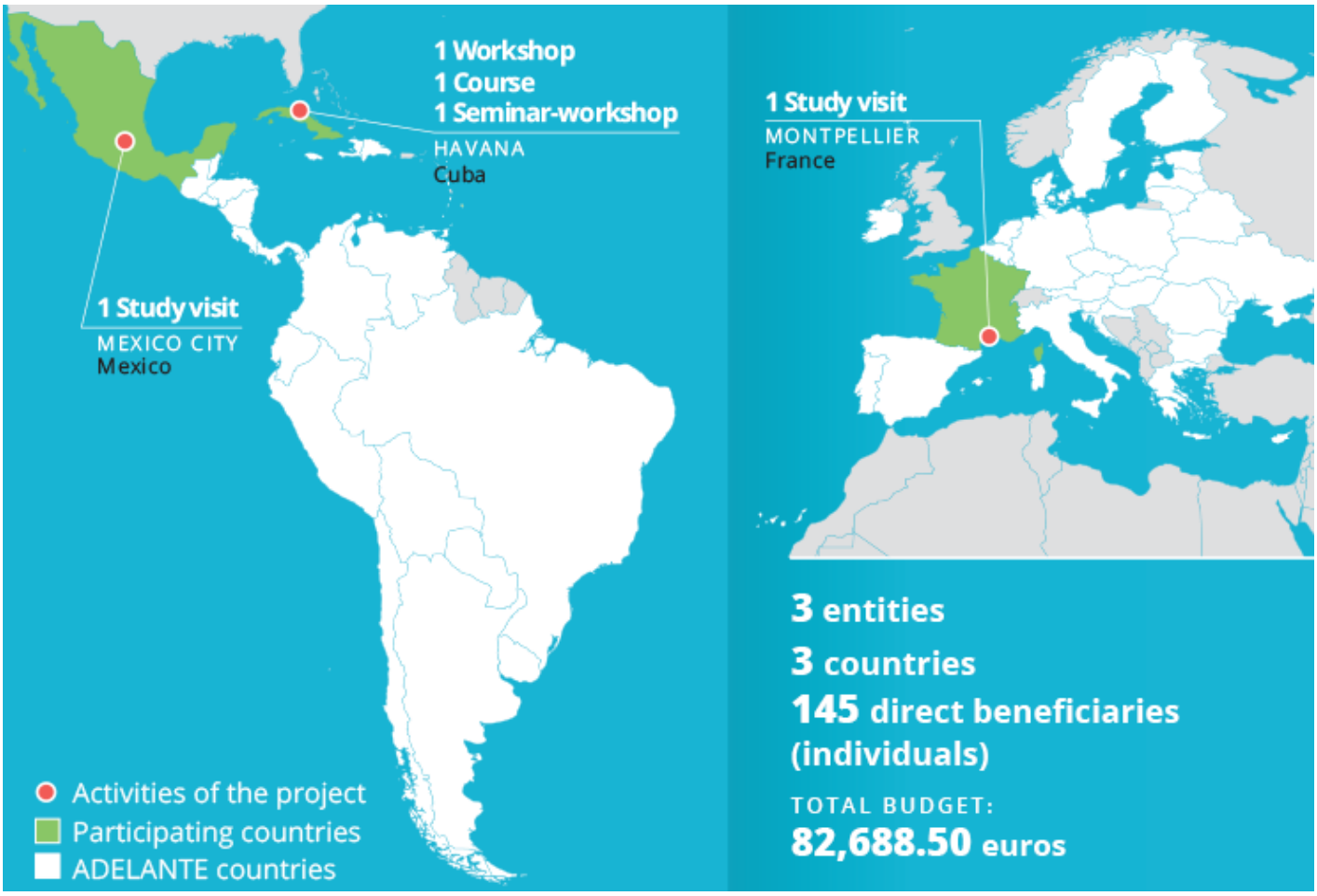
Goal 10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status

ADELANTE SDG

Goal 10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status

Goal 17.16 Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

Territorial approach



Intervention methodology

The project will begin with a workshop on the analysis of the molecular mechanisms of Alzheimer's disease, with the aim of discussing the latest developments on the topic. Following this, the tasks to be carried out will be established for all the objectives. After the workshop, three key professional training activities will be carried out. These will involve training in advanced techniques for the in vitro and in vivo evaluation of bioactive molecules in models related to inflammatory processes linked to AD. The development of a bioinformatics course has been planned to train staff involved in the most advanced molecular screening techniques, for the design of new drugs and their interaction with molecular targets. This will be based on the experimental results of the in vitro and in vivo studies developed. The seminar-workshop in this initiative will enable exchanges between researchers from Mexico, France and Cuba, with the aim of discussing the progress made on the topic.

Direct beneficiaries (individuals)

According to Rule 9 of the Guidelines for Applicants: all persons participating in the activities of the Initiative.

The beneficiaries of the project are all of the participants who will gain expertise through scientific exchange. The INB will benefit from two highly qualified Cuban researchers, who will directly train professionals from Mexico. Furthermore, CNEURO will train two professionals at the University of Montpellier (MMDM), which will provide its own resources as an in kind contribution. This will facilitate the transfer of knowledge and the exchange of experiences and good practices among the different countries involved, as part of the planned international mobility component. These benefits will then be passed on to students and teachers who participate in the training programmes designed as part of the project. In a broader sense, the results of this project could potentially be applied in other regions.

Budget

EU contribution: 66,088.50 €
Co-financing - Triangular Cooperation Partnership: 16,600.00 €
Total budget: 82,688.50 €