

Publishable summary

Goals of the project

Diseases of the brain have dramatic consequences, not only for the individuals and families concerned but also for national health care systems and national economies. Meeting these challenges requires new research and new skills. As a result, research in basic and clinical neuroscience has been expanding rapidly, and has involved scientists throughout the world. It is important that research institutions in the Mediterranean Partner Countries (MPC) should become full partners with EU centers in research on these themes. This was the goal of N€UROMED, an FP7 International Cooperation project designed to build up the research capabilities of the MPC in this fundamental and highly dynamic field.

N€UROMED built on existing collaborations and regional networks, involving 26 universities and research centers in Algeria, Egypt, France, Morocco, Spain and Turkey. The institutions involved in the project have complementary expertise and resources: researchers working in the project used state-of-the-art techniques and instruments to study the normal and pathological functioning of the brain at all its different levels of organization, from molecular interactions and electrophysiology to higher level cognition memory, language, and emotion.

N€UROMED brings this know-how together around four unifying themes:

1. Neurodegenerative, mental diseases and neurotoxicity
2. Neuroplasticity, pain, development, learning and education
3. Adaptation to environmental stress
4. New technologies and methodologies for the neurosciences

Results achieved

To achieve its goals, N€UROMED promoted twinning between centers of excellence in the EU and the MPC, recruitment of young researchers by MPC centers, two-way exchanges of staff, training, workshops, lectures, and training conferences.

Twinning

One of the project's most important goals was to promote *twinning* between universities and research centers in EU and in MPC countries. To promote this goal the project has organized 5 workshops involving all the partners in the Consortium. The first was held in Marseille (January 2010), the second in Fez Morocco (June 2010), the third in Valencia, Spain (November 2011), the fourth in Istanbul, Turkey (November 2012) and the last one in Marseille, France (May 2013). The workshops strengthened existing collaborations between EU and MPC centers and more importantly they gave rise to new collaborations. N€UROMED has rapidly created a Mediterranean network of neuroscientists. At the end of the project, each MPC partner in the project has at least one ongoing collaboration with a lab in the EU or in Turkey, as shown in Figure

1 below. Interestingly, the workshops also encouraged “South-South” twinning between labs in different MPC countries.

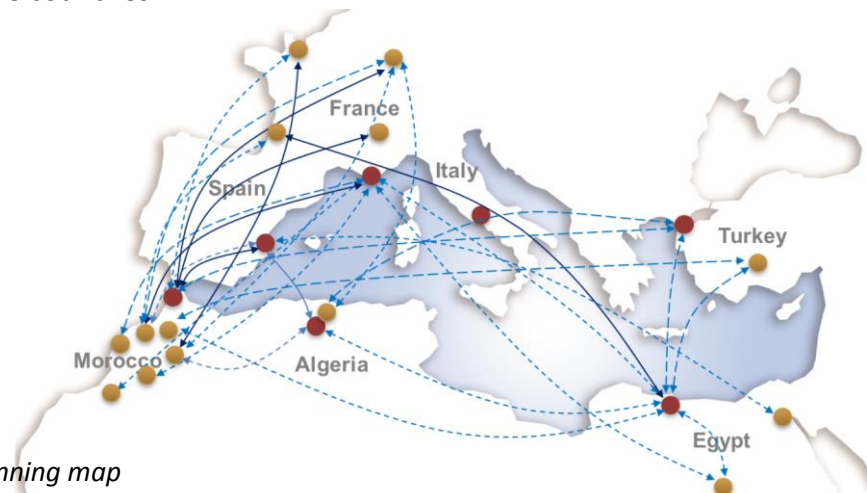


Figure 1: Twinning map

In this network diagram, collaborations existing before the start of the project are shown with solid lines; dotted lines show new connections. The Italian Partner shown on the map is a SME (Xiwrite Srl) that has taken responsibility for N€UROMED dissemination activities.

Staff and PhD exchanges

There were two kinds of exchange. On the one hand, the project has allowed 36 partner researchers to make short (one week) visits to each other’s laboratories to discuss possibilities for collaboration or advance the research on existing collaborations. On the other, it has supported a student exchange program in which 31 PhD students from MPC countries have visited EU labs for periods of up to eighteen months.

Promotion of recruitment by MPC labs

N€UROMED has successfully supported the recruitment of four young researchers by centers in the MPC countries. In Morocco, the project was able to support two young researchers wishing to return home after training abroad. In Algeria and Egypt, the project gave the possibility for two local researchers to spend one year abroad to strength their competencies and knowledge before returning home.

Workshops, lectures and in situ training in MPC centers

The project has successfully carried out an ambitious program of events (see table 1), aimed at transferring knowledge and know-how among the partners and at building local networks. In addition to the five Consortium wide workshops mentioned earlier, MPC labs have organized 12 local workshops, 12 lectures, three training conference and 4 international events, each proposed by a local partner or associated partner and each focusing on one or more of the project’s four unifying themes. For each event, the project created an international scientific committee that took responsibility for the design of the program. The response from researchers in the countries where the events were held was enthusiastic. Overall, N€UROMED events have been attended by more than 2000 participants (54.6% are women). The feedback after the event has been extremely positive.

Event Type	Name of event	Date	Host
SMC Meetings	1 st SMC meeting	15/12/2009	AU, Alexandria, Egypt
	2 nd SMC meeting	12/06/2010	USMBA, Fez, Morocco
	3 rd SMC meeting	13/12/2010	AU, Alexandria, Egypt
	4 th SMC meeting	19-22/09/2011	AMU, Marseille, France
	5 th SMC meeting	28/09/2012	YU, Istanbul, Turkey
NEUROMED Workshops	1 st Neuromed Workshop	14-16/01/2010	UnivMed, Marseille, France
	2 nd Neuromed workshop	10-11/06/2010	USMBA, Fez, Morocco
	3 rd Neuromed workshop	30/11/2011	UPVLC, Valencia, Spain
	4 th Neuromed workshop	28/09/2012	YU, Istanbul, Turkey
	5 th Neuromed workshop	2-3/05/2013	AMU, Marseille, France
NEUROMED Training Conference	1 st Neuromed Training Conference	12-17/12/2010	AU, Alexandria, Egypt
	2 nd Neuromed Training Conference	20-24/11/2011	BU, Blida, Algeria
	3 rd Neuromed Training Conference	23-26/04/2012	UAE, Tetouan, Morocco
MOROCCO Local Workshops	"Neuroscience, Nutrition and Neurocognitive Development"	24-25/04/2010	ITU, Kenitra, Morocco
	"Adaptative Processes, Stress"	17-18/12/2010	UMV, Rabat, Morocco
	"From physiology to physiopathology"	28-29/04/2011	SMSU, Beni Mellal, Morocco
	"Computational neuroscience"	2-3/07/2011	DE, Khemisset, Morocco
	"Psychiatry and Neurosciences"	18/10/2011	UAC, Casablanca, Morocco
EGYPT Local Workshops	"Neuroplasticity and Neurorepair"	28-29/04/2010	AU, Assiut, Egypt
	"Neuro-informatics in Pain and Development"	16-17/12/2010	AU, Alexandria, Egypt
	"Cognitive Neuroplasticity and brain imaging"	25-26/10/2011	AU, Assiut, Egypt
ALGERIA Local Workshops	"Neuroimaging, neuronavigation and neuroprotection"	25/05/2010	BU, Blida, Algeria
	"Neurochemical and cellular plasticity "	13-14/04/2011	USTHB, Algiers, Algeria
	"Functional Neuroimaging – IRM/EEG"	16-17/05/2012	BU, Blida, Algeria
TURKEY Local Workshops	"Brain plasticity - New tools and technologies"	8-11/06/2011	YU, Istanbul, Turkey
MOROCCO Lectures	"The brain orchestra", Prof. M. Bentivoglio, Univ. Bologna, Italy	27/09-02/10/2010	UMV, Rabat, Morocco
	"Parkinson disease - Drug dependence- Memory mechanisms", Prof. M. Morelli, University of Cagliari, Italy	07-10/11/2010	UAE, Tetouan, Morocco
	"Food intake regulation: Physiology and Physiopathology", Prof M. Najimi, SMSU, Morocco	28-29/04/2011	SMSU, Beni Mellal, Morocco
	"Parkinson Disease", Dr. Jordi Pérez, Institut de Biomedicina de Valencia, Spain	15/11/2011	UAE, Tetouan, Morocco
	"Basics of cellular electrophysiology", JM. Israel, University of Bordeaux, France	12-18/12/2011	UCA, Marrakech, Morocco
	"The drug-resistant epilepsies of the frontal lobe" Prof. P. Chauvel, AMU, France	6/05/2013	UMV, Rabat, Morocco
EGYPT Lectures	"Protein Interactions in Neurons: Methodological Approaches and Functional Implications", Prof. M. Landry, Bordeaux Univ., France	16-21/10/2010	AU, Alexandria, Egypt
	"Computational models in Neuroscience: Why and how?". Prof. G. Lemasson, Bordeaux Univ., France	8-11/11/2010	AU, Alexandria, Egypt
	"Cardiovascular Neuroscience", Prof. V. Macefield, School of Medicine, Sydney, Australia	21-23/02/2011	SCU, Ismailia, Egypt
ALGERIA Lectures	"Studies of some brain diseases", Prof E. Khedr, Assiut University, Egypt	31/05/2012	BU, Blida, Algeria

International events	"NMR imaging and spectroscopy", Dr A. Bessad, BU, Algeria and Dr T. Roussel, Univ. Lyon, France	31/05/2012	BU, Blida, Algeria
	"Brain and Plasticity", Prof M. Najimi, SMSU, Morocco	5/12/2012	USTHB, Algier, Algeria
	"Brain awareness week 2011"	14-20/03/2011	SMSU & ITU, Morocco
	International Symposium, "Learning, memory and cognitive function"	1-3/12/2011	UPVLC, Valencia, Spain
	"Brain awareness week 2012", 4 th MNS Conference, "Neural plasticity in health and disease"	19-20/03/2012 29/09/2012	UCA, Marrakech, Morocco YU, Istanbul, Turkey

Table 1: N€UROMED events during the 42 months

Travel and training grants

N€UROMED has provided travel grants allowing 37 students and 7 researchers from MPC countries to attend international scientific meeting.

It has also granted 8 students to take part in training courses and summer schools organized by top European scientific institutions.

Improving infrastructure in MPC research centers

One of the original goals of the N€UROMED project was to transfer equipment from EU labs to MPC partner centers, improving the quality of their infrastructure available to local researchers. Demand from the MPC partners is high. The programme has supported the transfer of few neuroscience equipment from EU labs to MPC partner centres and the acquisition of new equipment in MPC partner centres. The transfer and acquisition were complemented by 2 technical training sessions to help MPC researchers learn how to use these equipments.

Improve MPC participation in the EU Framework Program

The project also focused its efforts towards the creation of strong centers that can be full R&D partners for consortia working in the Framework Program. Some of the Neuromed partners will participate to the IRSES grant (2013-2017), called NEUREN that aims to set multilateral research projects between North and South Mediterranean labs. The last year funding of Neuromed supported the creation of Multi-Partners Collaborations that lead to the submission of a KBBE project entitled "Mediterranean Diet against Depression (MDAD)" in February 2013.

Dissemination

N€UROMED has rapidly acquired a large audience within the Mediterranean area. Three key factors have contributed to this success.

(1) Thanks to our dissemination partner (Xiwrite Srl) N€UROMED has a highly active and dynamic web site (<http://www.neuromedproject.eu>) which provides visitors with a wealth of up to date information on the latest developments inside and outside the project (exchange programs, job opportunities, conferences, workshops ,etc.)

(2) Existing networks of Mediterranean neuroscientists have played an important role in disseminating information on the project's activities. The French-Moroccan GDRI consortium has

played a particularly important role. Another vital contribution has come from the Mediterranean Neuroscience Society (MNS), created in December 2009 by the members of N€UROMED.

(3) N€UROMED has been very effective in collaborating with other neuroscience organizations and in reaching important neuroscientists in the countries participating in the project. Several well-known European neuroscientists have accepted invitations to participate in N€UROMED events

Publications

The members of the NEUROMED consortium published 22 articles in international journals.

Final results and their impact

NEUROMED's aims were to promote cooperation between EU and Mediterranean Partner Countries (MPCs) in brain research, through training and exchange of staff, recruitment of young researchers in MPC labs, transfer of know how through workshops, in situ training, lectures and schools. These aims have been largely reached, as the project has provided young researchers from MPCs to not only learn techniques and scientific procedures, but also the general culture of scientific research. Some of them have returned home on permanent positions, and will thus disseminate scientific knowledge and values in their lab and university. Others, the majority, has been given the opportunity to advance their doctoral work, through exchanges of short and long term stays, yearly schools, international meetings. These young researchers have made more than 20 publications in good to high impact journals, on issues ranging from Parkinson's disease to how animals survive in the desert without water. These discoveries make us advance our understanding of brain mechanisms in health and disease. Overall, NEUROMED has trained more than 2000 scientists in the MPS. This, added to the increased awareness of citizens and of the governmental authorities about the importance of advancing brain research, is a tremendous, long lasting impact. Researchers from EU and MPC labs are now in an active collaborative network, and will surely benefit from NEUROMEED's experience to raise new funds to pursue their collaborations.

Summary

N€UROMED has been active during 42 months. During this period, the project has established numerous twinning agreements between EU and MPC partners, funded and organized 68 exchanges of junior and senior researchers, organized 41 workshops, conferences and other events in Algeria, Egypt, France, Morocco, Spain and Turkey, funded attendance at major conferences by students from MPC countries and conducted a highly successful dissemination effort. The partners believe that it was a highly successful project and are now looking for opportunities and funding to sustain the efforts undertaken during the project.