

MACPROGEN

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Organisation:



Macedonian Academy of Sciences and Arts,
Research Centre for Genetic Engineering
and Biotechnology “Georgi D Efremov”
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Project title:

National Reference Centre for Genomics
and Proteomics

Acronym:

MACPROGEN

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Introduction

The MACPROGEN project aims at upgrading and improving the capacity of the Research Centre for Genetic Engineering and Biotechnology (RCGEB) “Georgi D Efremov”, Macedonian Academy of Sciences and Arts (MASA) for research and education in the fields of genomics and proteomics.

RCGEB was founded in 1986 as a research unit of MASA with the main goal of advancing scientific knowledge in the field of protein chemistry, molecular biology, genetic engineering and biotechnology through research, practical training of scientists and postgraduate studies. RCGEB is the first institution in Macedonia that started using the techniques of recombinant DNA technology in the diagnosis and prevention of inherited, malignant and infectious diseases and in forensic medicine.



Research Objectives

The main research interest of RCGEB has been molecular characterization of the most common monogenic diseases, with a special emphasis on haemoglobinopathies, as well as some aspects of the molecular epidemiology of infectious diseases.

The upgrading of the RCGEB infrastructure by MACPROGEN funds has enabled widening of the research objectives towards larger scale investigation of monogenic diseases, but also shifting of our research interest towards comprehensive studies of some common complex diseases, such as cancers, infertility and mental retardation by high-throughput genomic and proteomic technologies.



PGD for Thalassaemia

(b) DNA is isolated from the removed cell

(a) 1 cell with

(c) PCR is carried out on HBA1 or HBA2 genes. DNA as a template to produce many copies of the primers

HBA1

copies of the thalassaemia gene

(d) The PCR-amplified DNA is then sequenced

normal DNA
A T C T C A

mutant DNA
A T C A C A

(e) The sequence is then compared to a database of known gene sequences to determine whether or not it will cause thalassaemia

Project objectives

The main objectives of the project are establishing a technological platform for high-throughput genomics and proteomics research, networking with EU research institutions in order to foster collaborative activities, disseminating knowledge and expertise and ultimately building an interactive and competitive research environment.

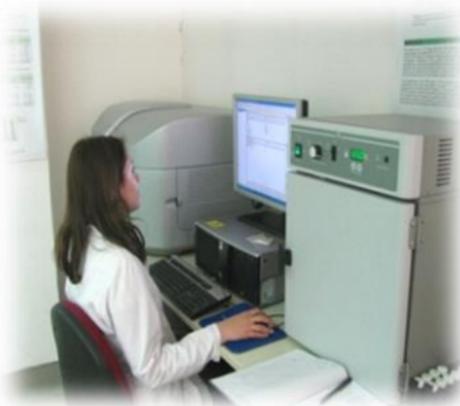


The work within the MACPROGEN project is organized in **five work packages** designed to support the main objectives:

- ✓ Management and Coordination
- ✓ Technological Platform and Employment
- ✓ Networking and Training
- ✓ Workshops and Symposia
- ✓ Promotion and Dissemination

New equipment

Updating the infrastructure of RCGEB by obtaining state-of-the-art equipment was one of MACPROGEN's key objectives. This was a priority for the RCGEB during the first half of the project. The equipment purchased includes: a versatile DNA microarray system allowing researchers to design and perform large-scale genomic studies, a 2-D DIGE system for proteomic analyses, a Genetic Analyzer for sequencing of genetic material, a real-time PCR system and a Bioanalyzer. The new equipment opens unprecedented opportunities for the development of contemporary research programmes resonate with one of the major goals of RCGEB, namely, modernisation of its research and better level of integration into the European scientific community.

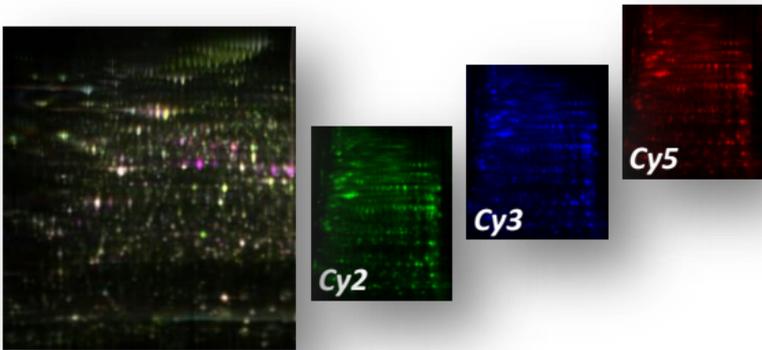


People

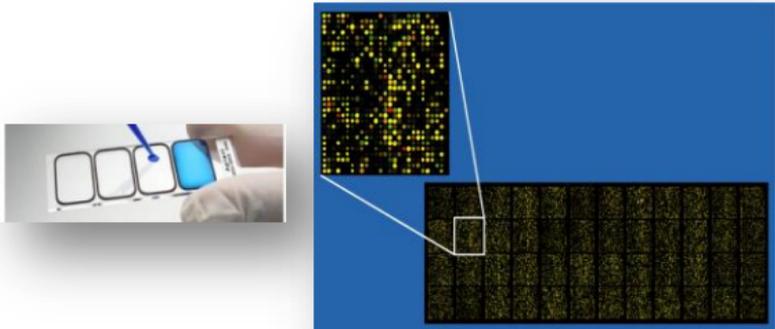
RCGEB staff consists of scientists working on a permanent basis, postgraduate students working on a particular project/programme, as well as scientists that are affiliated with other institutions but work part-time in RCGEB. At present, six researchers recruited to RCGEB are funded by MACPROGEN. They have been involved in setting up the new techniques in the laboratory. Thanks to their efforts the newly purchased equipment has been integrated into RCGEB laboratory practices. New assays have been developed and some of the results obtained have been used as preliminary data for the preparation of research project proposals.



Training



Knowledge transfer has been achieved through training of MACPROGEN researchers in the new genomic and proteomic technologies introduced to the RCGB with the newly purchased equipment. Several individual visits of researchers from RCGB to partner laboratories and other collaborating institutions have been organised. These aimed to ensure that RCGB researchers are familiarised with the microarray and 2D-DIGE technologies through practical experience.



Networking

A specific objective related to RCGEB's infrastructural expansion and scientific directions is to facilitate scientific training and foster networking with other institutions. We have established close collaboration with numerous scientists at leading EU institutions:

Wilhelm Johannsen Centre for Functional Genome Research, University of Copenhagen, Copenhagen, Denmark

Hannover Medical School, Gynaecology Research Unit, Hannover, Germany

University of Barcelona, Faculty of Medicine, Department of Physiological Sciences, Human Genetics Laboratory, Spain

University of Verona, Department of Mother and Child, Biology and Genetics, Section of Biology and Genetics, Verona, Italy

University of Copenhagen, Division of Genetics and Bioinformatics, IBHV, Copenhagen, Denmark

Institute Paoli Calmettes, Molecular Oncology Department, Oncogenomic Group, Marseille, France

Mondor Institute of Biomedical Research, Henri Mondor Hospital, Créteil, France

Institut Cochin, Inserm , University Paris Descartes, Paris, France

Laboratory for Cytogenetics and Genome Research, Department of Human Genetics, Biomedical Sciences Group, K.U.Leuven Leuven, Belgium

Workshops

A closely related objective is the organisation of workshops and symposia. The 1st Genomics and Proteomics Workshop took place in November 2010. The theoretical part of the workshop included lectures given by scientists from the EU partner institutions. The practical part was attended by all RCGEB scientists as well as 24 scientists from several Macedonian research institutions and included demonstration of several protocols using the major new equipment.

The 2nd Genomics and Proteomics Workshop has been planned for June 2011.



Promotion and Dissemination

Under Promotion and Dissemination our objectives are to advertise the activities and potential of the National Reference Centre for Genomics and Proteomics in order to strengthen collaboration with Macedonian and other Balkan institutions and increase the overall participation of locally based scientists in the Seventh Framework Programme. The website of the National Reference Centre for Genomics and Proteomics was launched during the second month of the project and has been regularly updated to reflect the progress of project activities. Leaflets containing relevant information on MACPROGEN have also been published and distributed during events, such as meetings, lectures, etc. Meetings with clinicians, health professionals and research scientists from several institutions are organised on a regular basis to discuss the Centre's policies for achieving optimal translation of its potential.



Project expected impact

The improved infrastructure and research environment will have long-lasting effects, such as enhanced levels of science communication and high-impact publications.

During the first reporting period of MACPROGEN, RCGEB scientists have participated in several scientific meetings and published 16 conference abstracts. MACPROGEN researchers have also published 10 papers in international and national scientific journals.

While we are now beginning to exploit the new opportunities at RCGEB, our aim is to eventually increase the impact of our science by publishing in highly competitive international journals. It is expected that the full effect of the introduction of state-of-the-art techniques will become visible in the years to come.

