

ProteoRed

National Institute for Proteomics

National Institute for Proteomics, ProteoRed is a National Network for the coordination, integration and development of the Spanish Proteomics Facilities providing proteomics services for supporting Spanish researchers in the field of genomics and proteomics.

ProteoRed technological platform was constituted in June 2005.

In terms of the administrative, operational, scientific and technological coordination, there is a Coordination Unit of ProteoRed settled at the CNB-CSIC: The Coordination Unit is assisted by CIC BIOBUNE in Bilbao and UAB-CSIC in Barcelona.

ProteoRed is coordinated by Dr. Juan Pablo Albar, from CNB-CSIC in Madrid, as General Coordinator and Dr. Jose María Mato, from CIC-BIOBUNE in Bilbao, and Dr. Joaquín Abián, from UAB-CSIC in Barcelona, as Associated Coordinators.

ProteoRed integrates 19 laboratories, 17 main partners and 2 associated facilities, geographically organized in six nodes.



The overall budget for ProteoRed activities along 5 years is 6.3 Mill €. The mayor part is located for personnel contracts.

Objectives

ProteoRed, Spanish National Proteomics Institute, aims to advance the science of proteomics, to further public education therein and to promote study and research work in proteomics and related subjects for the public benefit.

The main objective of ProteoRed is to coordinate and integrate the activities of the Spanish proteomics facilities and services and to evaluate the quality of the services offered.

To accomplish these objectives, ProteoRed is working to increase the specialization and competitiveness of the proteomics facilities, considering the type of technologies/equipment available and the type of customers, their expertise and their geographical situation.

ProteoRed network is also testing new technologic developments for providing new proteomics methodologies and equipment to the Spanish proteomics facilities. It will also establish open channels with the customers of these proteomics services to know their technological needs and the accuracy of the data, quality requirements and new services needed for the future. In connection with this, a Users Committee has recently been created. Protocols for sample storage, handling and sending are provided to the customers of the facilities.

An important number of people, 25 technicians, have been incorporated into the different nodes of ProteoRed network, to perform a technical work. To fulfill the objective of ProteoRed consortium, to provide quality and advanced proteomics services to customers all over Spain, training activities will be performed to improve the technical skill of the technicians.

ProteoRed develops multicentre experiments, both proposed by ABRF (WG1) and set up by ProteoRed itself (WG2), to improve and standardize protocols among the proteomic facilities that make up the ProteoRed network.

ProteoRed is also actively involved in the implementation of MIAPE requirements. MIAPE requirements are being defined by HUPO-PSI community and it contains the minimal information about a proteomics experiment allowing both an unambiguous description of the context of the experiment, understanding perfectly the interpretation of the results and a critical evaluation of the experiment execution. In summary, MIAPE documents allow to reproduce as much as possible any proteomics experiment.

ProteoRed also takes care of the coordination of courses, workshops and meetings to promote and enhance the quality of proteomics knowledge through the scientific community, ProteoRed technical people and governmental agencies.

The ProteoRed Consortium is coordinated with other technological platforms promoted by Genoma España like the National Bioinformatics Institute (NBI). This coordination is implemented through a common working group in the bioinformatics area composed by personnel from NBI and personnel from ProteoRed. Due to the increasing importance of bioinformatics in the proteomics science, the bioinformatics group in ProteoRed has recently been reinforced and at the moment is made up of four bioinformaticians.

The international focus of ProteoRed is valued by the relationship and collaboration established with other proteomics networks, proteomics international platforms or projects as the Human Proteome Organization (HUPO) for the identification and characterization of all human proteins, the European Proteomics Association (EuPA), the Association of Biomolecular Resource Facilities (ABRF) or the Portuguese Proteomics Network (ProCura), and international centres as the Turku

Centre for Biotechnology or the Instituto de Tecnología Química e Biológica (ITQB). In the bioinformatics field, there is a strong relationship between ProteoRed and institutions as the EMBL-European Bioinformatics Centre (EMBL-EBC) or the Swiss Institute of Bioinformatics (SIB).

ProteoRed network offers major services necessary in all the stages involved in the protein analysis process: protein fractionation, separation and purification of peptides and proteins, protein identification, quantitative determination of peptides and proteins, protein sequencing, complex analysis of proteins, peptide mass fingerprinting, analysis of mass spectra, image analysis and peptide synthesis and differential proteomics.

Working Groups

Moreover, seven working groups, composed with experts from the network, have been constituted to get all ProteoRed objectives and to support the proteomics facilities and services, with the idea of extending their supporting to the 19 proteomics facilities. The seven defined working groups (WG) for supporting the proteomics services are:

- **WG 1.** Technological development and standardization of protocols
- **WG 2.** Specimen collection and handling
- **WG 3.** Bioinformatics supporting area
- **WG 4.** Functional organization of proteomics facilities and coordination of price scales.
- **WG 5.** Training, education and diffusion
- **WG 6.** Internationalization and coordination with other proteomics consortia or international platforms
- **WG 7.** Biomedical proteomics

The protocol of activities composed for ProteoRed Consortium is divided in two main areas:

1. **Coordination and Integration tasks** of the current proteomics services supported by the 6 ProteoRed nodes.
2. **Development and support of the proteomics services** with the proposed tasks of the seven working groups.

Our customers

The type of customers for the proteomics services of ProteoRed are:

- Research groups from the University
- Research groups from CSIC
- Research groups from other public institutions
- Research groups from hospitals

- Private companies (biotech and pharmaceutical companies)

Customers have three different ways of access to ProteoRed proteomics services:

- Web site access through Internet
- Access through the 6 nodes, as many customers are nowadays used to access directly to the proteomics services they work with
- Direct phone, fax, email access through the Coordination Unit

As reported above, a Users Committee has been created to provide an input for the needs of the users that can be used to improve the services of the ProteoRed network.

Communication Strategy

The communication strategy of ProteoRed activities is carried out in four different ways:

- General dissemination activities through mass media and scientific meetings all over Spain, in collaboration with Genoma España
- Printed leaflets of ProteoRed Technological Platform and network activities to be distributed through academic groups, hospital research groups, companies...
- Specific dissemination activities by each node and associated groups, so the diffusion of ProteoRed existence and activities will be more effective
- Public website of ProteoRed

ProteoRed project Summary

- 6 nodes with 17+2 proteomics facilities that cover all Spanish territory.
- Strong coordination capacities and a well-structured network and management structure.
- Established international relationships with international platforms and institutions.
- Equipment: the 6 nodes are very well-equipped with the most modern technologies nowadays available.
- Personnel: the 6 nodes contribute with expertise personnel. In fact, the 6 nodes include the major experts in proteomics nowadays in Spain (Juan Pablo Albar, Anabel Marina, Concha Gil, Ignacio Casal, Jose M^a Mato, Félix Elortza, Jesus M. Arizmendi, Fernando Corrales, Joaquín Abian, Joaquín Arribas, Eliandre de Oliveira, Xavier Avilés, Oriol Bachs, David Andreu, Xosé Bustelo, Francisco J. Blanco, Manuel Sánchez del Pino, Roque Bru, Jose Antonio Bárcena, Samuel Ogueta, etc.).
- Expertise in the 7 work packages proposed for the development and support of the Spanish proteomics services.

- Main Spanish customers work nowadays with one of these proteomics facilities.
- Experienced proteomics services with established public access, operating procedures and many services performed.

Summary of the services offered by the ProteoRed activities

Protein and Peptide Molecular Weight Analysis

Molecular weight analysis by MS-MALDI TOF and MS-SELDI-TOF
Molecular weight analysis by ESI MS (Q-TOF and Ion Trap)

Protein Identification

Peptide Mass Fingerprinting by MS-MALDI-TOF and MS-SELDI-TOF
Peptide Mass Fingerprinting by MS-MALDI TOF/TOF
Protein Identification by LC (1D and 2D) ESI-MS/MS
Protein identification by LC-MALDI TOF/TOF
Protein Identification by nESI-MS/MS (off-line)
De novo sequencing

Characterization of Protein Modifications

Identification of postranslational modifications

Sequencing

Edman Protein Sequencing (cap)

Electrophoresis

1D Electroforesis IEF
1D and 2D Electroforesis SDS-PAGE

Differential Proteomics

2D Electroforesis (classical, DIGE)
Stable isotopic labelling (ITRAQ, ICPL)
Protein Profile Analysis using MS-SELDI-TOF

Peptide Synthesis

Peptide Synthesis
Peptide Arrays
Peptide Antigen Design
Coupling to Carrier (KLH, OVA, BSA)
Antibody Purification

Bioinformatics Tools

Image Analysis tools
Functional Data Analysis and Retrieval (PIKE)
MIAPE Compliant Reports

Gel Staining

Sample Preparation

Other Services

Biacore
Gel Scanning
Protein and peptide fractionation by HPLC
Microorganism identification
Electroblotting