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## The needs of researchers for biological NMR

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## Evolution of the Concept of Research Infrastructures (RIs)

### • 2000 (Strasbourg)

"Large RIs are used as service facilities by a variety of scientific communities. In some areas very large and complex RIs have developed, raising problems in their construction, maintenance, and access."

→ **Technique oriented**

### • 2003 At the Trieste Conference it was pointed out that

"A possible weakness of Europe has emerged in Postgenomics, in which the very fast evolution of the necessary infrastructures requires an exceptional concentration of efforts which must be flexible and differentiated. It is felt that this aspect should be considered urgently."

### • 2006 Which should be the new vision of RIs?

Coordination of centers of excellence where each brings its unique tools and experience in addressing the various aspects of a research project.

→ **Problem oriented**

## A Frontier of Biomedical Science

There is the need to correlate the **structure of proteins**, in a Genomic perspective, to their **function**, to their role in a **protein interaction network** (Interactome), to their **individual variations** (SNPs) and involvement in **diseases** with the ultimate goal of the rational development of **new therapies**.



New, integrated RIs should be established which gather the complementary expertise to address these challenges

**In this frame, which is the role of BioNMR?**

Which questions can the biomedical community address through bio-NMR Infrastructures?

A "mature" application: **Structures**

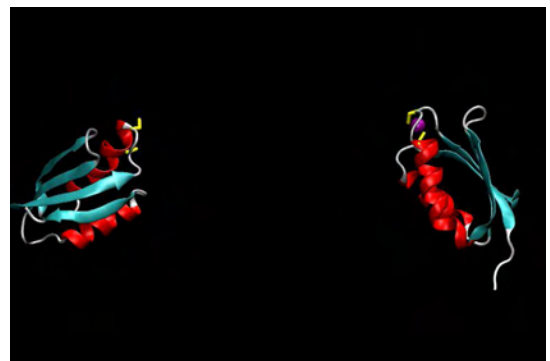
**NMR** is the only technique which can solve structures at the atomic level in solution, i.e. in conditions as close as possible to the physiological ones

**Solid State NMR** represents a frontier in the structure determination of membrane and immobilized proteins

## But NMR is not only structure!

**NMR** goes beyond a static picture. NMR is also:

- dynamics → **molecular recognition**
- weak protein-protein interactions → **integration with the interactome**



### But NMR is not only structure!

NMR goes beyond a static picture. NMR is also:

- dynamics → molecular recognition
- weak protein-protein interactions → integration with the interactome
- unfolded proteins → understanding diseases due to misfolding
- metabolomics → metabolome of living organisms
- drug design → genome-based drug development

### Do we have a dream?

From the genome to cellular processes and their regulation

Integration of structural knowledge at the molecular level within the environment of the cell

This challenge requires the coordination of a number of tools and techniques which provide information at different resolution and the filling of gaps between them, in the context of Systems Biology

This can happen only through:

Coordination of Centers of Excellence in Europe in an Integrated European Research Infrastructure

### FESP

#### Forum for European Structural Proteomics

"A policy-oriented forum for European structural genomics to assess infrastructures and set a strategic research agenda."

#### What do we plan?

- Assess Structural Genomics/Proteomics projects
  - Assess Infrastructures with respect to the needs for Structural Genomics/Proteomics in Europe and the rest of the world
  - Develop strategic plans for an European policy in Structural Genomics/Proteomics
- ↳ a position paper on assessment information and a strategic roadmap for future directions



Participate in the virtual forum for exchange of ideas and comments!!!

<http://www.ec-fesp.org>