

## Drug discovery and development

### CAPACITY DESCRIPTION

The first step in the drug discovery and development process is focused on understanding the biology that explains the disease, identifying new therapeutic targets that play an essential role in this disease in order to demonstrate and validate both the target actually involved in the disease as it is candidate for therapeutic intervention. Once identified, an enzymatic or cellular assay was developed for determining or measuring the pharmacological activity of any specific drug.

For this, the high throughput screening is a process in which the robotic and data processing are combined to quickly identify compounds, antibodies or genes that modulate a specific molecular pathway. It can analyze large consignments of drugs to identify possible binding activity or biological activity against target molecules. Those molecules ('hits') that

show a positive result and appear to have therapeutic potential could be identified as lead molecules due to their higher pharmacological properties (solubility, permeability, stability, etc.). Once identified a candidate drug ('Lead'), scientists try to optimize their ability to fight disease by modifying their structure using different techniques encompassed in medicinal chemistry.

Rational drug design aims at developing drugs which are highly specific to a particular target in certain pathology, hoping for a better therapeutic outcome with potentially fewer side effects, and also by taking into account the cellular localization of the target and the administration method used, what is vital for choosing the design of small molecules, biologicals (proteins, antibodies) or nanodrugs.

### BUSINESS SECTORS OF APPLICATION

The main objectives are the development of new therapeutic approaches and diagnostics in high impact disease in public health like cancer, neurodegeneration, tisular regeneration or chronic and acute inflammation.

### TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The organization of the development of new medicines in the CIPF is based on multidisciplinary teams that involve chemists, biologists, pharmacists, bioinformatics and clinical collaboration with the same objective which is not very frequently given in research centers and is one of the strengths of the program.

Thus, the laboratories of the CIPF address the various stages of drug development: while some research teams focusing on finding therapeutic targets to target the drugs (including new high-performance technologies in the process as bioinformatics, genomics, proteomics and metabolomics), others are studying the properties of medicines which could have future clinical application (activity, structural characteristics, and pharmacology suitable cell transport).

### DEVELOPMENTAL STATE OF THE TECHNOLOGY

Since 2005, the CIPF has developed multiple lines of research aimed at developing innovative and precision medicines, through its drug screening platform as well as through its Polymer Therapeutics and Peptides and Proteins laboratories. The main capabilities offered by these laboratories and services are related below.

## 1. Pharmacological Screening Service

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Screening service is an important tool and it also owns two libraries of chemical compounds (Myriad and Prestwick) what makes it very useful. It also has a library of fragments for carrying out modularly pharmacological screening through interactions with selected proteins (previously labeled with  $^{15}\text{N}$  and / or  $^{13}\text{C}$ ) by NMR. This platform has been selected as one of 50 screening centers specializing in European strategic infra-structure ESFRI EU-OPENSREEN.

### 2. Polymer Therapeutics Laboratory

The laboratory has demonstrated expertise in various aspects of the field, from the synthesis of polymeric carriers and derivative nanoconjugates targeted for the treatment of different pathologies until its biological evaluation in cell and animal models.

### 3. Peptides and Proteins Laboratory.

This laboratory has an extensive experience in the development of modulators of protein-protein interactions. Its expertise focuses primarily on the regulation of macromolecular complexes involved in programmed cell death and inflammation pathways.

#### **IPR**

The scientific activity of the laboratoris is currently organized in the framework of the Chemical Medicine, which has the know-how, equipment and expertise to address drug discovery projects: from basic research (eg, identifying molecular molecular targets and its validation) to translational research (eg, drug development both small molecules and advanced therapies including nanomedicine).

#### **DESIRED BUSINESS RELATIONSHIP**

Collaborative research projects or contract research and consultancy.

#### **RELATED PICTURES**

#### **CONTACT DATA**

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