

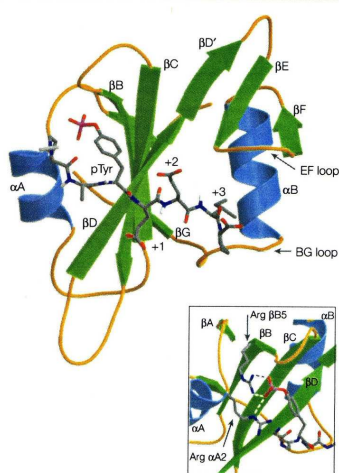
## Master Students Research Project

### Peptidomimetics for phosphoproteome analysis

The phosphoproteome consists of the entire complement of phosphorylated proteins (p-Pr) in cells. Phosphoproteomics may prove to be valuable in unravelling p-Pr as markers that are potential drug targets or of predictive value in disease therapeutics. As the stoichiometry of phosphorylation is very low and the event is highly dynamic, phosphoproteome analysis usually comprises a first step of enrichment. Despite progress on the development of enrichment methods, IMAC (Immobilized Metal Affinity Chromatography) using Fe<sup>3+</sup>, Zr<sup>4+</sup> or Ti<sup>4+</sup> remains the commonest method with its associated low selectivity. The need of proteomic methods compatible with large-scale analysis is a trigger for the development of selective and robust p-Pr binding molecules.

Peptidomimetics are peptide-based structures that can be designed and engineered to target specific molecules. This proposed research project focuses in the development of peptidomimetics with potential to bind to phosphorylated proteins and will be carried out in the framework of a collaboration project with Dr. Ana Cecilia Roque (PTDC/EBB-BIO/102163/2008).

This proposal will involve:



(i) In silico studies of the specific interactions with phosphorylated proteins and the design of the peptidomimetics binding to the targeted phosphorylated moieties (molecular modeling).

(ii) Solid-phase synthesis of the peptidomimetics using standard Fmoc solid-phase chemistry and an automated peptide synthesizer.

(iii) Subsequent purification by reverse-HPLC and characterization by mass spectroscopy (ESI-MS or MALDI-MS) and circular dichroism spectroscopy (CD).

(iii) Preliminary screening of the interactions between the peptidomimetics and phosphorylated proteins (protein quantification methods; fluorescence microscopy; high-throughput screening methods).

Supervisors: Dr. Olga Iranzo ([oiranzo@itqb.unl.pt](mailto:oiranzo@itqb.unl.pt))

Dr. Ana Cecília Roque ([cecilia.roque@dq.fct.unl.pt](mailto:cecilia.roque@dq.fct.unl.pt))

Area: Chemistry - Biotechnology

Location: ITQB – UNL (Bioinorganic Chemistry and Peptide Design Laboratory)

REQUIMTE (Departamento de Química, FCT – UNL)