

## Phase summary

Phase 1 of the project 74 PCCDI/2018 (acronym TehnoBioMed): “Emerging molecular technologies based on micro and nano-structured systems with biomedical applications” had unfolded in 5 constituent projects, comprising a total number of 21 activities. Hereby we briefly present the principal results obtained for each of the constituent project.

### Project 1

- A series of nanostructured substrates were fabricated, characterized and tested, serving as multifunctional nanoplatforms, in order to develop specific applications provided in this project.
- A new microfluidic device was developed and a patent application was filled and sent for evaluation.
- A series of molecules (pMPBA, pMBA pATP) with chemical affinity for the fabricated nanoplatforms were selected and characterized in order to facilitate the connection of the nano-platforms with the corresponding pathogens or antimicrobial agents.
- A model of bacterial biofilm was developed for the purpose of testing the nano-platforms.

### Project 2

- The translocation of dendrimers through proteic nanopores of alpha( $\alpha$ )-hemolysin was characterized employing molecular electrophysiology experiments.
- Volumetric analysis of polyamidoamine dendrimers (PAMAM) in different hydration and confinement states, located inside of nanometric cavities was performed.

### Project 3

- Extensive documentation was collected as a prerequisite to the configuration of a high-resolution OCT imaging equipment and also in order to design the corresponding contrast agents.
- The necessary composing parts of the OCT imaging system, destined to investigate biological samples and various materials, were acquired.
- The contrast agents necessary for samples' examination with the OCT imaging system, were developed.

### Project 4

- The working protocols for obtaining, purifying and physicochemical characterization of the immunogenic conjugate of pesticide-protein were established.
- A novel product was obtained: the immunogenic conjugate of pesticide-protein (3,6-dichloro-2-methoxybenzoic acid conjugated with bovine serum albumin).
- The working protocols to obtain and characterize the magnetic and non-magnetic nano-particles based on  $\text{Fe}_x\text{O}_y$ ,  $\text{SiO}_2$  and Au, were established.
- Immunization procedures on laboratory animals were established, and the immunization process to obtain anti-pesticides antibodies was initiated.

### Project 5

- An extensive documentation study on cyanobacteria cultures growth and on the extraction and purification of phycobilins, was conducted.
- Three different cyanobacteria strains were cultivated, and the corresponding phycobilins (phycocyanin-PC, phycoerythrin-PE) and also the phycobilisomes complexes were extracted and purified.
- The optical characteristics of phycobilins and phycobilisomes were investigated by using steady state absorption and fluorescence spectroscopies.