

**Project no. 74 PCCDI/2018, acronym TehnoBioMed: „Emerging molecular technologies based on micro and nano-structured systems with biomedical applications”  
code PN-III-P1-1.2-PCCDI-2017-0010, time interval January 2021 - March 2021**

### **Stage 4 Summary**

Stage 4 of the project 74 PCCDI/2018 (acronym TehnoBioMed), web page: <http://www.itim-cj.ro/PNCIDI/tehnobiomed/> had unfolded in 5 constituent projects, comprising a total number of 11 activities. Hereby we briefly present the principal results obtained for each of the constituent project:

#### **Project component 1**

- The antibacterial effect efficiency of the newly developed plasmonic nanoplatfoms was assessed and the antimicrobial peptides-functionalized nanoplatfoms inactivation of bacterial biofilms was validated.
- We successfully validated the real time detection efficiency of crystal violet molecule using SERS spectroscopy on a newly developed network gold nanopillars on polymeric substrate fabricated using thermal nanoimprint lithography technique.

#### **Project component 2**

- A new experimental protocol employing fluorescence microscopy was elaborated in order to investigate the interaction mechanisms of biologically active molecules used to induce the conjugation of dendrimers with biomimetic lipidic systems.
- Three types of antimicrobial peptides-dentrimeric conjugates (P6\_ PAMAM-NH<sub>2</sub>, P6\_ PAMAM-OH and P2\_ PAMAM\_OH) were produced and characterized by monitoring the intrinsic fluorescence quenching of tryptophan sequence from each conjugate.
- The cytotoxic effect of dendrimers on normal skin BJ cells was investigated.

#### **Project component 3**

- The efficiency of the SD-OCT device on the incipient periodontitis diagnosis was demonstrated, thus offering increased chances for a quick, efficient and nontraumatic remediation.
- The efficiency of SD-OCT device was tested to assess the uniformity and thickness of deposited thin films and the substrate thickness.

#### **Project component 4**

- A new procedure for the immunochemical characterization of antibody nanoimmunisorbent-type was established. The same procedure was used in order to assess the amount of antibodies fixed on the surface of SiO<sub>2</sub> nanoparticles.
- The protocol for preliminary assessment of dicamba pesticide and the recovery coefficient of the same pesticide in contaminated environment samples using nanoELISA method in homogenous phase was established.
- The kinetic parameters (dissociation constant, association constant, constant of association rate, constant of dissociation rate) of anticamba antibodies purified through affinity chromatography were determined by using interferometry in lipidic bilayers and ITC experiments.

#### **Project component 5**

- Photosensitive materials composed of phycoerythrin and semiconductor nanoparticles were characterized through time-resolved continuous wave fluorescence spectroscopy.
- The energetic transfer of photosensitive materials composed of phycobiliproteins and gold plasmonic nanoparticles was characterized by imaging microscopy.
- The optimization protocol to assess the experimental parameters of new photosensitive materials was finalized.

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