

Project 3.1 The SERS- based Theranostics for Proteomics Analyses of Salivary Gland Tumours Extracellular Vesicles – towards personalized oncology

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www: <http://www.bio-sers.pl/>

Background:

Tumors of the head and neck region, which include salivary gland tumors (SGTs), are diagnosed in Poland in approximately 11,000 people per year. Over the past ten years, the number of patients diagnosed with cancers in this group has increased worryingly by as much as 25%. SGTs are especially difficult to diagnose because of their stochastic nature, heterogenic histopathological and genetic diversity (largely unexplored variety of entities and subtypes), and the disease symptoms commonly appear at a late stage. Therefore, establishing a novel theranostic (therapy and diagnosis) approach through a combination of effective cancer detection/diagnosis methods and treatment modalities for clinical uses is a formidable need and challenge.. SERS is nowadays an outstanding technique in biological applications with such high sensitivity that it can detect analytes to subfemtomolar concentrations, which is exceptional and has no analogs. Exosomes (EVs), as a subset of Extracellular Vesicles, carry genetic materials and proteins and play an essential role in intercellular information exchange signal transduction and various pathophysiological processes in the human body and, therefore, are ideal biomarkers for medical diagnosis and therapeutic efficiency management in the proposed SERS-based cancer theranostics method.

Aim:

The project scientific objective aims to solve basic and applied problems that are important for developing the novel dielectrophoretic (DEP) isolation and Aptamers (APTs) based recognition biosensor using SERS techniques for comprehensive investigation of the proteomic profile and underlying biological role of exosomes and exosomal proteins associated with Salivary Gland Tumors (SGTs).

Requirements:

- Master's degree in Chemistry/Biology/Biophysics or related field;
- knowledge and practical experience with spectroscopic methods;
- experience with Raman spectroscopy/SERS technique will be an advantage;
- knowledge and experience with physico-chemical methods of surface examination (SEM/AFM/XPS) will be an advantage.
- good command of English..Sc.