



## KONWERSATORIUM INSTYTUTU FIZYKI UMCS

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### *„Extracellular vesicles as biomarkers of diseases – Where physics meets biochemistry and medicine”*

Last decade there is a growing interest in small membrane vesicles released from cells called *extracellular vesicles* (*EVs*). *EVs* have been primary observed between 50-ties and 60-ties by G. E. Palade and later on by P. Wolf, who noticed their distinguish role in platelet secretion and coagulation. Now, it is commonly accepted that extracellular vesicles (*EVs*) are abundant in all body fluids and they play essential role in intercellular communication. Cells can release *EVs* either constitutively, upon activation, or during apoptosis, often under condition leading to cell stress or dysfunction. In general, *EVs* can be classified into three distinct populations based on their size, density, cellular origin, release mechanisms and marker proteins: *exosomes*, *ectosomes* (*microvesicles*) and *apoptotic bodies*. Because *EVs* are released in pathological state with different extend then in physiological condition, *EVs* can serve as suitable markers of disease. Their number and molecular profile are changing under ischemic conditions, hyperglycemia, cancer and inflammation. Number of molecular and spectral methods has been applied to characterise *EV* content deciphering their molecular signature, specific for a disease state. *EVs* chemical stability in the circulation or intercellular space, their ability to reach and internalize target tissue are considered to be the most desired property of *EV*-based also to develop drug delivery systems.

During the seminar I will reveal how use of Raman spectroscopy, DLS, NTA, AFM, SIMS and other techniques e.g. molecular biology methods, will help to assign *EVs* as biomarkers of diseases.

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Uprzejmie zapraszam wszystkich pracowników, doktorantów i studentów Instytutu Fizyki.

Dr hab. Ryszard Zdyb, prof. UMCS  
Dyrektor IF UMCS