

**Presentation title:** **Design and Development of Aptamer-Based Biosensors for Rapid detection of *Pseudomonas aeruginosa***

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**Abstract (250-300 words):**

*Pseudomonas aeruginosa* is a rod-shaped gram-negative bacterium, which is a critical threat to hospitalized patients with compromised immune systems or underlying health conditions. Therefore, it is crucial to rapidly diagnose *P. aeruginosa*. The standard culture and biochemical techniques commonly employed in hospitals are characterized by being time-consuming, labor-intensive, and depending on the expertise of professionals. Biosensors have become alternative tools for rapid and accurate detection of pathogen bacteria. By employing a specific aptamer for recognition of P. aeruginosa, in this study, we aim to develop an electrochemical apta-biosensor for rapid and sensitive detection of this bacterium in less than one day. The utilization of aptamer-based biosensors for environmental monitoring has gained significant attention, primarily due to the unique advantages offered by aptamers. Aptamers are able to selectively bind to a diverse range of target molecules, spanning from small molecules to bacteria. The successful development of the sensor was confirmed through SEM observation and cyclic voltammetry (CV) measurements. The created apta-biosensor operated by detecting the conformation change of the specific aptamer for *P. aeuruginosa* upon binding with the target bacterium, resulting in the decrease of the current peak measured by square wave voltammetry (SWV). Additionally, to enhance the sensitivity of the biosensor, we investigated the use of methylene blue (MB) as an amplification agent. The MB significantly enhances the signal response of the apta-biosensor, leading to improved detection sensitivity. The modified apta-biosensor with MB detects *P. aeruginosa* with the limit of detection (LOD) value of 2 x 108 CFU/ml and the sensitivity of 7.94 x 10-7 µA/CFU.ml-1/cm2.

**Biography (150-200 words):**

My name is Somayeh Maghsoomi, and I am deeply immersed in the world of microbiology as a Ph.D. student at the Medical University of Vienna, collaborating with Donau University Krems. During my master's studies, I honed my skills and became a professional in the microbiology field. These skills, combined with my dedication and passion for research, have prepared me well for my Ph.D. project. My research is concentrated on the intricacies of infection biology, with a specific focus on developing rapid detection methods for *Pseudomonas aeruginosa*. In my first year of PhD, I've already produced promising results, laying the groundwork for future studies involving patient samples in medical contexts. My fervent pursuit of advancing diagnostic techniques underscores my commitment to improving healthcare outcomes.