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A compact Raman spectroscopy-based device for rapid identification and characterization of pathogens directly from human body fluids

Rapid and accurate identification of pathogens is one of the biggest challenges in medicine. Timely identification of causative agents and their antimicrobial resistance profile can significantly improve the management of infection, lower costs for healthcare, mitigate ever-growing antimicrobial resistance and, in many cases, save lives.

We aim to prepare a compact device consisting of a microfluidic chip and optical tweezers systems, which can be added to a commercial Raman spectrometer to quickly, non-invasively, and non-destructively detect and further characterize microbes and their resistance/sensitivity to antimicrobial agents directly from human body fluids. Currently, we have a functioning system and we are tuning the optical tweezers part, to reach the quality of Raman fingerprints sufficient for identification of pathogens.

Application

Rapid, non-invasive, non-destructive identification of microbes and their virulence factors from tiny sample volumes.

At the first stage we focus on bloodstream infections.

Competitive Advantage

- Golden standard = culture-based methods (slow: 48 h or more), other methods: need for expensive consumables and/or cells do not remain viable
- Our compact device would allow cheap, easy, almost real-time diagnostics (in several minutes).

Market Assessment

- Target: European market (global population, especially patients with severe infections)
- Only input costs, no expensive consumables needed = a cheap, fast and environmentally friendly, sustainable method
- An accessory for existing devices (Raman spectrometers)

IP Status

- technology concept formulated
- aim: technology validated in lab

Needs

- Regulatory expertise (incl. ethical issues)
- Possible future financing: more extensive testing of the technology in the lab and on the actual patient samples
- Mediating communication with industrial partners

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