**Towards an integrated automatic platform for rapid determination of antibiotic susceptibility of target bacteria**

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Rapid detection and assessment of antibiotic susceptibility of target pathogenic bacteria is demonstrated in a label-free format, further advancing our portable analytical platform 1, 2.

Immunomagnetic separation combined with periodic magnetic actuation and electrical impedance spectroscopy (EIS) monitoring are used in an innovative set-up allowing identification and determination of antibiotic susceptibility of target bacteria captured with specific magnetic nanoparticles (MNP).

Based on formation of Bacteria-MNP aggregates and their magneto-hydrodynamic behavior the EIS data provide rapid detection of intact target bacteria, and in conjunction with, microscopic modeling and complementary optical assays, to antibiotic susceptibility information.

Impedance data at two selected frequencies, highlight the magneto-hydrodynamic behavior contrast related to different antibiotic effects demonstrating method capability to both detect and assess antibiotic susceptibility of target bacteria.

We report on rapid pathogen detection and determination of antibiotic susceptibility directly from spiked samples.

All components of the assays are integrated into an automated system to enable rapid point of care diagnostic support.

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