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Abstract (poster session)

A novel molecular-based diagnostic screening test utilising the NanoCHIP® microarray technology for simultaneous detection of nosocomial infections: MRSA, VRE and KPC

Z. Greenberg*, V. Hurgin, R. Sabban-Amin, M. Fridlender, J. Kopelowitz, S. Gross (Ashdod, IL)

Objectives: Methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin-Resistant Enterococci (VRE) and *Klebsiella pneumoniae* carbapenemase (KPC) colonization in hospital admitted patients is the leading cause for Hospital Acquired Infections (HAI). It is now evident that HAI can be widely prevented through screening of patients before or during hospital admission and proper patient isolation and management. Savyon Diagnostics has recently finalized the development of a novel molecular-based diagnostic screening test for simultaneous detection of MRSA, VRE and KPC directly from a variety of swab sample types. The test utilizes Savyon's proprietary NC400 NanoChip® molecular electronic microarray system. The aim of this work is to demonstrate the utility of the NanoCHIP® technology for screening large number of samples for simultaneous detection of MRSA, VRE and KPC in various swab samples. Methods: DNA was extracted from various types of characterized swab samples. Pathogen and antibiotic resistance specific genes were amplified through multiplex PCR and subjected to the NC400 NanoCHIP® system. The generated amplicons were electronically addressed to discrete loci on the NanoCHIP® cartridge, pre-activated with specific capture oligonucleotides. Detection was achieved through specific fluorescent reporter oligonucleotides. The output analysis of each sample was compared to the characterization of the respective original swab sample, as characterized by real-time PCR in various laboratories. Results: The NanoCHIP® results were in complete accordance with the characterizations of the tested samples in terms of clinical sensitivity and specificity. The NanoCHIP® multiplex analysis provided clear results about the identity of the pathogen and its antibiotic resistance from sample to result within a working day time frame. Additional identifications of related non-pathogenic microorganisms were possible per specific requirements. Conclusions: The NanoCHIP® has proven to be a useful platform for medium-high throughput screening of MRSA, VRE and KPC colonization, offering reliable diagnosis from various types of swab samples. This technology, and in particular its oligonucleotide addressing and multiplexing features, presents significant advantages, mainly in terms of minimal hands-on time, improved laboratory workflow and turn around time, enabling flexibility and saving costs.