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Poster Session IV
Molecular detection of bacterial resistance

VALIDATION OF A NEW DNA EXTRACTION METHOD FROM AGAR OR LIQUID SWABS FOR MOLECULAR DETECTION OF MRSA, VRE AND KPC UTILIZING THE NANOCHIP® MICROARRAY TECHNOLOGY

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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 HospitalAcquired Infections (HAI). It is now evident that HAI can be widely preventedthrough screening of patients before or during hospital admission and properpatient isolation and management. Savyon Diagnostics has recently finalized thedevelopment of a novel molecular-based diagnostic screening test forsimultaneous detection of MRSA, VRE and KPC directly from a variety of swabsample types. The test utilizes Savyon's proprietary NanoChip®XL molecularelectronic microarray system. The aim of this work is to demonstrate the compatibilityof different swabs (amies agar and liquid swabs, Copan, Italy) with our PCR - NanoCHIP®technology for screening large number of samples for simultaneous detection ofMRSA, VRE and KPC in variety of clinical samples.

Methods. After routine diagnostic procedure positive amies agar gel as well as liquid(eSwab) medium transport swabs were kept at -20°C. A new protocol was developedin order to allow fast and easy DNA extraction from clinical samples. Pathogenand antibiotic resistance specific genes were amplified through multiplex PCRand subjected to the NanoCHIP® system. The generated amplicons wereelectronically addressed to discrete loci on the NanoCHIP® cartridge,pre-activated with specific capture oligonucleotides. Detection was achievedthrough specific fluorescent reporter oligonucleotides. The output analysis ofeach sample was compared to the characterization of the respective originalswab sample, as characterized by real-time PCR in various laboratories.

Results. The novel extraction protocol demonstrated a full compatibility with thedownstream PCR-NanoCHIP® technology. The results were in completeaccordance with the characterizations of the tested samples in terms ofclinical sensitivity and specificity.
Conclusions. TheNanoCHIP® has proven to be a useful platform for medium-high throughputscreening of MRSA, VRE and KPC colonization, offering reliable diagnosis invarious types of swab samples. The newly developed protocol improves thelaboratory workflow, minimizes hands-on time and consequently turnaround time,simplifies the pre-PCR DNA extraction procedure, and overall reduces costs.