

DETECTION OF *STAPHYLOCOCCUS EPIDERMIDIS* ON BIOFILMS BY FLUORESCENCE *IN SITU* HYBRIDIZATION (FISH) USING A NOVEL PEPTIDE NUCLEIC ACID (PNA) PROBE

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Background: Contamination of catheters by *Staphylococcus epidermidis* might cause life-threatening complications such as septicaemia. Here, we report the development and application of a novel peptide nucleic acid (PNA) probe for the specific detection of this bacterium by fluorescence *in situ* hybridization (FISH).

Methods: The probe was shown to be highly specific and sensitive, as it was able to detect all *S. epidermidis* strains tested but not closely related species such as *Staphylococcus aureus*. The PNA FISH technique was adapted for the pathogen detection in catheters, and applied to screen 52 indwelling catheters that had been inserted in patients. Neither of these patients exhibited complications associated with infections derived from the insertion of the catheter.

Results: Most catheters had levels of 10^3 - 10^5 total cells/cm² (as assessed by DAPI), and in a small percentage of them, the presence of *S. epidermidis* was detected by PNA FISH. However, no slime matrix enclosing the cells was observed and detection by standard culture methods was negative for most catheters (84.6%).

Conclusions: This work provides a rapid molecular biology method to assess infection of *S. epidermidis* in catheters and confirms the presence (albeit in low numbers) of this bacterium in asymptomatic patients that were tested negative by cultivation techniques. As such, PNA FISH will not indicate a potentially hazardous contamination of *S. epidermidis* simply based on the presence/absence of the bacterium. Further studies will attempt to correlate infection with the numbers of *S. epidermidis* cells detected by PNA FISH or the presence of a biofilm matrix.