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Development of a phage cocktail to prevent *Proteus mirabilis* biofilm formation in urinary catheters.

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Proteus mirabilis is an enterobacterium that causes catheter-associated urinary tract infections (CAUTIs) due to its ability to form crystalline biofilms on the surfaces. These CAUTIs are very difficult to treat, since the biofilm structures are extremely tolerant to high concentrations of antibiotics. Bacteririophages (phages) have been used widely to control and prevent a diversity of bacterial species, however a limited number of phages for *P. mirabilis* have been isolated and studied. Here we report the isolation of two novel virulent phages, the myovirus vB_PmiM_5460 and the podovirus vB_PmiP_5461 able to target respectively 57% and 100% of all *Proteus* strains tested in this study. Both phages have been characterized thoroughly and sequencing data revealed no traces of genes associated with lysogeny. To further evaluate the phages ability to prevent catheter colonization by *Proteus*, phages adherence to silicon surfaces was assessed. Both phages were able to adhere, but the extent of adhesion was found to be phage dependent. Further tests in phage-coated catheters using a dynamic biofilm model simulating CAUTIs, have shown a 90% significant reduction of *P. mirabilis* biofilm formation up to 168 h of catheterization. These results highlight the potential usefulness of the two isolated phages for the prevention of surface colonization by this bacterium.