The use of precision silver nanoparticles for protecting indwelling medical devices from biofilm formation".

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More than one in twenty hospitalized patients acquire an infection during their confinement resulting in over 103,000 deaths in the US per annum. The average cost of treating a hospital acquired infection is $57,000. Many of these infections are associated with indwelling and implanted medical devices. Processes for imparting antimicrobial activity to devices is being increasingly demanded by health care professionals. However finding antimicrobial agents that are either broad spectrum in action or tolerant to the processes used for making devices has not been easily achieved. We have invented a method of making and applying broad spectrum antimicrobial nano-particles of silver to the surface of medical devices at the post manufacturing stage. There are several unique aspects to this wet dip process. It causes the formation of uniform nano-particles in the range of 2-20 nm in diameter. These nano-particles adhere evenly on surfaces of a wide range of materials, including nylon, PE, stainless steel, titanium, Teflon, glass, PVC, rubber and polypropylene according to TEM and chemical analysis. The uniformity is due to even dispersement and contact with devices during the wet-dip immersion application process. The tissue biocompatible nano-reservoirs of silver prevent biofilm formation through the release of ionic silver. The duration of activity is dependent upon the density of the nano-reservoir that, by extrapolation of the elution of ^{110m}Ag, may be greater than 100 days from a 5-7 $\mu g/cm^2$ treatment. Color and antimicrobial activity are stable for greater than 1 year. This proprietary wet-application nano-particle technology has commercial potential for conferring broad spectrum antimicrobial activity on a wide range of medical device materials.