Sociedad Argentina de Microbiología General

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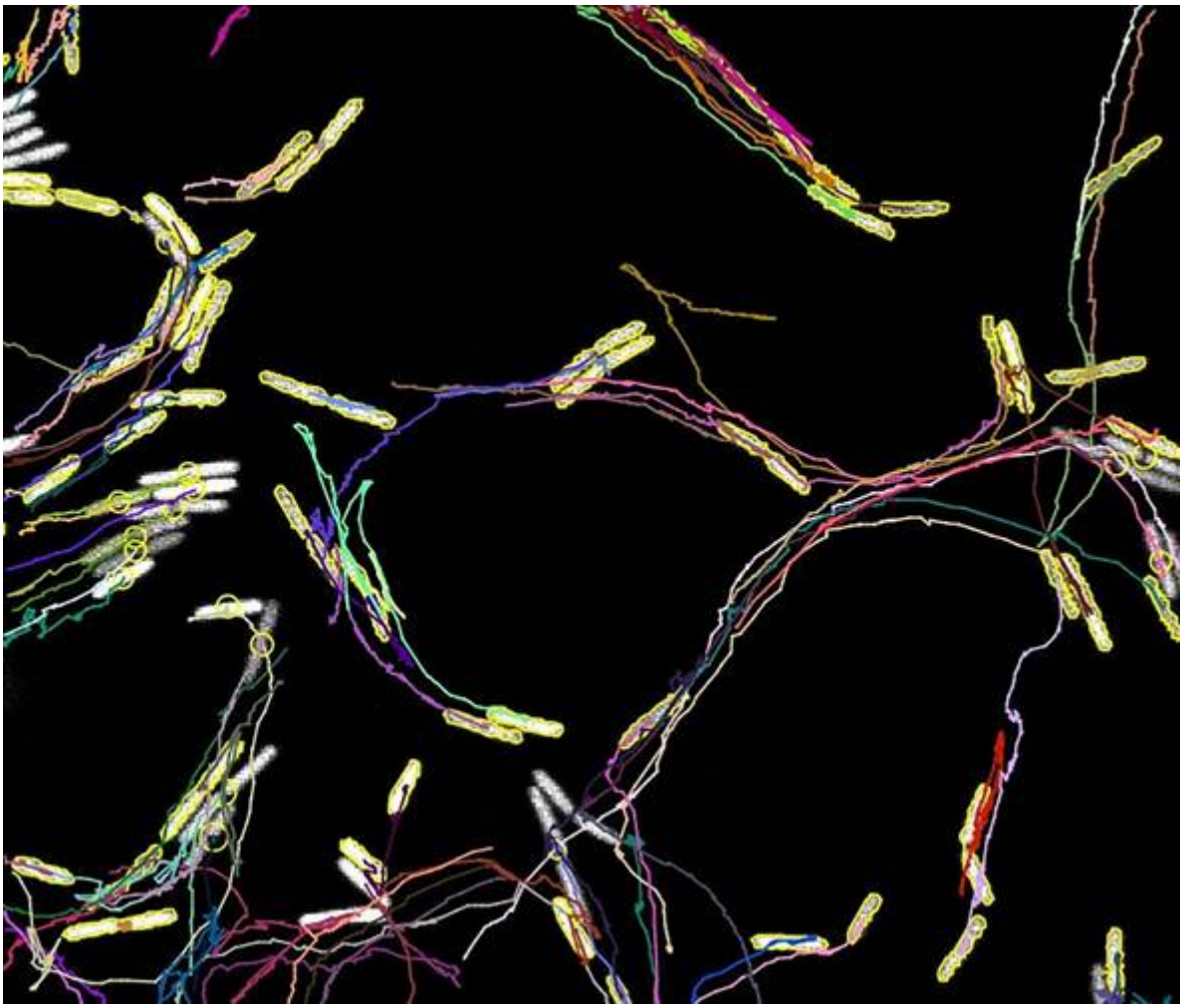

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

DEVELOPMENT OF PHOTOACTIVATED ANTIMICROBIAL COATINGS FOR INANIMATE SURFACES BASED ON NANOPARTICLES

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Contamination of inanimate surfaces has always been a major concern in hospital settings due to its impact on the epidemiology of nosocomial infections. Touch screens are one of the primary factors that favor the dissemination of resistant pathogens. The objective of this work was to develop a coating for inanimate surfaces based on metallic and bimetallic gold and silver nanoparticles, which activate their antimicrobial properties when irradiated with LED light. Starch was used as a reducing and stabilizing agent in the nanoparticle synthesis. The nanoparticles were characterized using UV-Visible spectrophotometry, DLS, and transmission electron microscopy (TEM). The maximum absorbance peaks corresponded to the wavelengths absorbed by gold (525 nm). Additionally, another absorbance peak (420 nm) was detected in the spectrum of the bimetallic nanoparticles, corresponding to the presence of silver. TEM results confirmed the hexagonal morphology of the gold nanoparticles, with an average size measured between 20-25 nm. Notably, colony-forming unit counts of the treated samples demonstrated significant inhibition of *Staphylococcus aureus* and total inhibition of *Escherichia coli*. This effect was achieved in just 15 minutes of irradiation, indicating effective antimicrobial activity against both Gram-negative and Gram-positive microorganisms. Furthermore, TEM images taken 15 minutes after irradiation showed changes in the morphology of *Staphylococcus aureus* colonies, suggesting that the nanoparticles also possess activity against Gram-positive microorganisms. Concurrently, a bubbling effect on the membranes of *E. coli* bacilli and internal cell damage were observed. Moreover, the inclusion of the synthesized nanoparticles in a commercially purchased liquid glass was found to be favorable, with stability in this material recorded at least for 90 days.

Palabras clave: nanotechnology- antimicrobial coatings- bimetallic nanoparticles