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Tyrosine - Silica biostructures for improved drug delivery against S. aureus

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Despite the technological progress, the rate of efficient antimicrobial drug development remains low. Due to the increasing microbial resistance rates, novel therapeutic approaches for increasing the efficiency of current drugs are needed. Here, we report the synthesis, characterization (FT-IR, XRD, SEM) and bioevaluation of a novel tyrosine-silica hybrid nano-biostructure, for the improved delivery of erytrhomycin and clotrimazol antibiotics, used in the treatment of *Staphylococcus aureus* infections. Antimicrobial effect was quantified by a dilution method in order to establish the MIC (minimal inhibitory concentration) of tested antibiotic loaded nanostructures. *In vitro* biocompatibility was assessed through fluorescence microscopy. The prepared nano-biostructure showed IR bands which were assigned to Si–O–Si (stretch mode). The prepared bio-active nanostructures have significantly improved the anti-staphylococcal activity of erytrhomycin and clotrimazol, as demonstrated by the drastic decrease of the MIC of the respective antibiotics loaded in the nanostructure. These results, correlated with a good biocompatibility of this porous structure, tested on cultured human diploid cells highlights the possibility of using this nano-carrier for the delivery of the antimicrobial substances in lower active doses, thus reducing their cytotoxicity and related side-effects.

Biography

Monica Cartelle Gestal has completed her PhD at the age of 26. Since then she has been awarded with the Barrie the la Maza postdoctoral fellow and two different Marie curie awards. The first, a FP7 for her project to study quorum sensing system, in the second she was part of a study group to develop new antibiotic targets. Now she is a Professor and P.I and she wants to join together her two passions, antibiotic resistance and quorum sensing.

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