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New approaches in antimicrobial chemotherapy against gram-positive biofilm infections

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Bacterial biofilms cause chronic infections because they show increased tolerance to antibiotics and disinfectant chemicals as well as host's immune defense mechanisms. Because of the rising in multidrug resistance from infectious agents, there is a prompted interest for the development of new antimicrobial agents and new therapeutic strategies to combat the infections caused by the resistant bacterial biofilm infections. Antimicrobial cationic peptides (AMPs) have attracted attention as alternative antibiotics due to their prospective potency, rapid action, and broad spectrum of activities against Gram negative and positive bacteria, viruses, fungi and parasites. AMPs can be found as major component of the innate immune systems of most living organisms, including insects, plants, microorganisms, and mammals, to protect against environmental microorganisms. In addition, they exhibit multiple mechanisms of action and consequently, a low potential to induce the resistance, which allows the limited use of other antibiotics. Therefore, we investigated the *in vitro* pharmacokinetic activities of antimicrobial cationic peptides (indolicidin and nisin) alone or in combination with antibiotics (daptomycin, linezolid, teicoplanin, ciprofloxacin) against MRSA biofilms. With checkerboard technique, synergistic interactions against MRSA biofilms were frequent with almost all antibiotic-AMP combinations. The time kill curve studies demonstrated that synergistic interaction occurred most frequently when using nisin+daptomycin/ciprofloxacin, indolicidin+teicoplanin. No antagonism was observed. Consequently, use of a combination of antimicrobial agents can provide a synergistic effect and may help prevent or delay the emergence of resistance. AMPs seem to be good candidates for further investigations in the treatment of MRSA biofilms, alone or in combination with antibiotics.

Biography

Emel Mataracı-Kara has completed her PhD from Istanbul University, and Post-doctoral studies from Istanbul University Faculty of Pharmacy. She has published more than 15 papers in reputed journals.

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