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Standing up against antibiotic resistance with synergistic approach

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Antibiotics have revolutionized medicine in many respects and their discovery was a turning point in human history. Unfortunately, the use of these wonder drugs has been accompanied by the rapid appearance of resistance. The acquisition of Extended-spectrum- β lactamases (ESBLs) and Metallo- β lactamases (MBLs) by bacteria confer resistance against the majority of available antibiotics. The outbreak of such multi drug-resistant bacteria has posed a serious concern globally, by jeopardizing the optimism of therapeutic success against future infectious diseases. Monotherapy has been a choice to treat invasive infections since ages. Nevertheless, combination therapy has proved to be a promising substitute over monotherapy for infections that do not respond to standard treatments, such as infections occurring by MDR species. Infact, combination therapy is persistently recommended as empirical treatment for bacterial infections in intensive care units, where monotherapy fails to combat infections. Hence, we have conducted a study to explore the potential synergistic combinations of different antibiotics against extended-spectrum β -lactamase and metallo β -lactamase producers. The MICs were determined against 12 strains, harboring different resistant markers (*bla*_{NDM}, *bla*_{C_{TX-M}}, *bla*_{TEM}, *bla*_{SHV}, *bla*_{OXA} and *armA*), followed by *in vitro* synergy testing using microdilution, chequerboard and time-kill assays against different antibiotics. Results suggested that, of all the tested combinations, cefoxitin gave highest rate of synergy when paired with streptomycin and cefotaxime, thus forming effective synergistic combination against multidrug-resistant bacteria. Interestingly, the combination of cefotaxime/cefoxitin showed synergistic activity even against the atrocious NDM-1 producing strains. Therefore, this novel synergistic combination can be used against different resistant strains, including NDM-1 producers.

Biography

Sadaf Hasan completed her PhD in November 2013 from Interdisciplinary Biotechnology Unit, Aligarh Muslim University, India. She was a recipient of Doctoral Fellowship award (UGC-MANF). She worked on oral biofilms and is currently working as a Research Associate studying antibiotic resistance. She has participated in several national and international conferences. She has published her work in 5 journals of international repute viz., *PLoS One*, *BMC Microbiology* and *Future Medicine*. She is a member of Biochemical Society, UK and has been serving as a reviewer for some international journals.

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