

Press Release

Institute of Microbial technology (IMTECH) and National Institute of Pharmaceutical Education and Research (NIPER) are working on a joint proposal on tackling the multidrug resistance in bacteria.

Antimicrobial resistance (AMR) has now been accounted for significant morbidity and mortality throughout the world. In particular, some serious life-threatening infections caused due to “ESKAPE” (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Enterobacter* species) pathogens capable of ‘escaping’ the biocidal potential of antibiotics. Efflux pumps are the most lethal weapon bacteria possesses to develop resistance. The multi-drug resistant ESKAPE pathogens have emerged as major nosocomial pathogens with associated mortality rates as high as 60% among susceptible populations. Antibiotic resistance is thought to be mediated by a wide range of efflux pumps that extrude toxic agents, including antibiotics, from the bacterial cell. Reversal and removal of acquired as well as intrinsic antibiotic resistance respectively, can be achieved via inhibition of drug transporters. Therefore, blocking them seems to be an effective strategy which could reverse the rate of antibiotic resistance. The main goal of this proposal is, to develop suitable preclinical candidates as Efflux Pump Inhibitors (EPis) (with enhanced therapeutic index) which can be used as an adjunctive therapy to restore the activities of current and future antibiotics. Small molecule EPis in many ways present themselves as the most promising approach to tackle this looming crisis. In addition to this, it will help us in reducing frequency of resistant mutant strains and physiological tolerance to antibiotics. Natural resources such as specific plants have a diverse role in an effort to identify lead EPis; still there are significant technical hurdles.

The outcome of the present study is a well characterized library of synthetic and semi-synthetic molecules capable of inhibiting prototype efflux pumps, Identification of novel chemical scaffolds responsible for efflux inhibition and Societal benefits such as improvement of quality of life, affordable healthcare and livelihood generation. In vitro and in vivo efficacy studies in combination with antibiotics and determination of in vitro cytotoxicity will be done at Institute of Microbial technology (IMTECH) while National Institute of Pharmaceutical Education and Research (NIPER) will be handling lead optimization and Pharmacokinetics/Pharmacodynamics (ADME) evaluation of shortlisted candidates. Recently the joint project for this study amounting about **One Crore Rupees** has been awarded by Department of Biotechnology, Govt. of India to Dr. Hemraj Nandanwar, IMTECH, Chandigarh and Prof. Sanjay Jachak, NIPER-Mohali.



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