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Development of phyto-drugs to tackle multi-drug resistant bacterial infections during corona virus pathogenesis

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C ince December 2019, gradual genetic changes of coronavirus genome specifically spike protein increased Utransmission from Wuhan virus to Alpha and Delta viruses but recent Omicron variants have slightly higher transmission but less pathogenic. Corona epidemic spread worldwide claiming >634000 lives and secondary multidrug resistant infections were found a risk factor specifically in ICU patients containing carbapenemresistant Acinetobacter baumannii, Pseudomonas aeguginosa, Enterococcus faecium and Klebsilla pneumoniae. MDR plasmids have acquired >10 mdr and drug efflux genes to inactivate antibiotics and development of new antibacterial drugs are urgently needed. Plants secret anti-metabolites to retard growth of soil and water bacteria and are ideal source of antibiotics. Six plants derived bacteriocidal organic extracts were selected testing 80 medicinal plants against MDR bacteria. A Cassia fistula bark saponin bromo-polyphenol compound (CU1) inhibited RNA polymerase from Escherichia coli as well as Mycobacterium tuberculosis as compared to refampicin. Gel shift assays demonstrated that CU1 interferes at the open promoter complex formation step. Further, a single tree of Suregada multiflora was grown five years in roof top at Kolkata and its root extracts was found exceptionally active (18 fold than natural sources) against MDR bacteria. We purified the active principle NU2 by TLC and HPLC, and also confirmed by MASS, NMR and FT-IR. NU2 phytochemical also inhibited some parasites of the Genus Leishmania, Trypanosoma and Plasmodium. NU-2 actively inhibited the DNA topoisomerase I and RNA polymerase of Escherichia coli suggesting the modes of action. We think antibiotic void will increase due to few reasons: (1) mdr genes are accumulated in large conjugative plasmids with many transposons and integrons; (2) the spread of mdr genes in bacteria is increasing at \sim 5%/year and (3) mdr genes creation facilitates to protect gut microbiota from antibiotics. Thus, phyto-drug may be a solution to curve secondary bacterial infections in coronavirus infected patients.

Biography

Dr. Asit Kumar Chakraborty was performed his PhD at CSIR-Indian Institute of Chemical Biology, Kolkata and awarded PhD degree in 1990 from Calcutta University. He did postdoctoral work at University of California at Berkeley and visiting scientist at Johns Hopkins University School of Medicine. He was Associate Professor of Biochemistry at OIST, Department of Biotechnology, Vidyasagar University and now retired.

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