Quorum sensing inhibition may mediate anti-microbial efficacy of Quellthera EPQ-100 botanical drug candidate against multi-drug resistant ESKAPE pathogens

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According to the Center for Disease Control (CDC) 1 out of 25 patients contracts a hospital acquired infection (HAI). These infections are often from Multi-drug resistant (MDR) bacteria. The species of MDR bacteria that are responsible for most HAIs are known as the “ESKAPE” pathogens (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter species). Although there are a few promising antimicrobial agents, currently in preclinical stages, there is still an urgent and immediate need for novel anti-infective agents with activity against these pathogens. Polyphenols in fresh cut plant tissues are involved in significant antimicrobial activity that is not exhibited once extracted. The short-lived biologic activity of these metabolites has been a foundation of traditional medicines used successfully by many cultures for the treatment of human diseases caused by microorganisms. We evaluated the antimicrobial activity of a novel botanical drug candidate developed by Quellthera Inc., to mimic in-vivo levels of plant antimicrobial activity. Our results show that the test material is effective against the MDR strains of ESKAPE at surprisingly low concentrations. Evidence further suggests this anti-microbial activity is significantly mediated by quorum sensing inhibition. The bacterial strains used for the study were the multidrug resistant (MDR) ESKAPE pathogens; Enterococcus faecium (MDR1674620), MRSA Staphylococcus aureus (ATCC 33591), MDR Klebsiella pneumoniae (ATCC BAA-2473), Acinetobacter baumannii (MDR 1674627), Pseudomonas aeruginosa (MDR 1674623), and Enterobacter cloacae (ESBL 1744299). The following susceptible wildtype QC strains were used for Broth Microdilution Minimal Inhibitory Concentration (MIC) assays to determine the antimicrobial susceptibility of the test articles: S. aureus ATCC 29213, and Escherichia coli ATCC 25922. Chromobacterium violaceum strain 12472 was used to study inhibition of quorum sensing by test product. Quellthera material showed growth inhibition of the ESKAPE pathogens at low concentrations. Low concentrations of Quellthera’s EPQ-100 demonstrated effective inhibition of various MDR bacteria. Preliminary data suggest further investigations of its novel non-antibiotic mechanism of action and its potential to obviate drug resistance while promoting stability of the normal gut microbiome.