Multidrug-resistant (MDR) strains of bacteria continue to provide considerable challenges for clinicians who face a decreasing arsenal of antibiotics, many of which are analogues of compounds for which resistance has already arisen. MDR strains of Mycobacterium tuberculosis, other Gram-positive pathogens such as S. aureus, Clostridium difficile and the intrinsically-resistant Gram-negative bacteria such as Salmonella enterica and Pseudomonas aeruginosa require the development of new classes of antibacterial which are ‘opaque’ to efflux, or alternative strategies to reduce the MDR phenotype, for example the use of efflux pump inhibitors (EPIs).

Plants are an untapped source of antibacterial chemotypes and at present there are no examples of phytochemicals which are used clinically. This is unusual given the wide use of plant materials in traditional systems of medicine, which in many communities of the developing world are the only resource available for the treatment of topical or even systemic infections. We have been studying plants that are used medicinally for their antibacterial and resistance modifying properties and have isolated a number of compounds that display potential such as the garlic metabolite1 and the Hypericum2 natural product 2, which display MIC values of 0.1 and 2 mg/L against M. tuberculosis and S. aureus respectively. In collaboration we have also investigated the ability of plant-derived compounds such as the natural product 3 to inhibit multidrug efflux, having dual antibacterial and EPI activity. This lecture will cover the need for antibacterials and resistance-modifying agents and will propose plant natural products as a useful source of these molecules with examples from our work to date.