

## Exploiting the insect gut to discover novel plant-derived antibiotics and explore naturally-occurring resistance



### *BBSRC Industrial CASE PhD studentship*

**Supervisor: Prof. Tony Maxwell, Dept. Biological Chemistry, John Innes Centre, Norwich, UK**

**Collaborating companies: Plant Biosciences Ltd. (PBL) & Inspiralis Ltd.**

Antibiotics are highly effective against many bacterial infections, but currently there are serious concerns about antibiotic-resistant bacteria (e.g. MRSA), largely due to widespread use, and misuse, of antibiotics. It is crucial that academic labs make a more significant contribution to the discovery of new anti-infective drugs. Natural products offer a diverse reservoir of compounds and are the source of many antibiotics. Plants provide a rich, largely untapped source of natural products, some of which have antibacterial properties.

We will isolate diverse bacteria from the guts of insects feeding on specific plants and determine their susceptibility to a range of drugs and toxins. We will analyse extracts from the food plant with the aim of discovering metabolites with potential anti-microbial activity. Specifically, we will select plant/insect pairs, e.g. eucalyptus spp./goliath stick insect, Cruciferous spp./diamond-back moth, Hypericum spp./oecophorid moth. Insect gut bacteria will be cultured and isolates identified. Susceptibilities of insect gut bacteria to a range of antibiotics/toxins will be compared with those from culture collections. If the insect gut isolates show increased resistance to certain drugs/toxins, extracts from the food plant will be prepared and tested against sensitive and resistant bacterial strains. If a component of the extract is toxic to control species, we will fractionate the extract and assay fractions using sensitive/resistant bacteria as a bio-assay. HPLC/MS/NMR will be used to identify active components, which will be evaluated for their potential as antibacterial agents. We will also investigate the mechanisms of resistance to antibiotics/toxins to gain a better understanding of naturally-occurring resistance in the environment. This novel approach aims to identify novel phytochemicals with anti-bacterial activities and to improve our understanding of naturally-occurring bacterial resistance.

This 4-year BBSRC funded CASE studentship offers full funding to UK nationals and EU nationals who have resided in the UK (in full-time education or full-time residency) for 3 years prior to the start date of the studentship. In most other cases EU nationals will receive funding to cover their tuition-fees only. The current stipend for 2011/12 is £ 13,590 per annum + a CASE enhancement of £2,500 pa. For further information and an application form, please visit: <http://www.jic.ac.uk/students/admissions.htm>.

**Deadline for applications: 29<sup>th</sup> Feb. 2012; Contact: [tony.maxwell@jic.ac.uk](mailto:tony.maxwell@jic.ac.uk)**