**Title of Project:** Carnivorous plants. Do they have the answer to multi-drug resistant tuberculosis?

**(FOR Code/s):** 1104

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**Location of Project:** Campbelltown

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**Project Background**

Tuberculosis (TB), along with malaria and HIV are the three ‘big’ infectious diseases ravaging the developing world. While there is a battle to develop pharmaceuticals which may combat these diseases, the rapid adoption of drug resistance in these organisms is hindering efforts. Once almost eradicated from Australia, TB is staging a resurgence due the uncontrolled use of antibiotics, which has resulted in the development of multidrug resistant strains of the pathogenic organism. Thus, the discovery of novel sources of anti TB compounds is essential to prevent the further spread of the disease.

One such source of new TB compounds comes from a very interesting group of carnivorous plants called the sundews (*Drosera* species). The purpose of these antibiotics in the plant is still unknown but it has been postulated that the plant use these antibiotics to disinfect its prey [1]. Previous studies have postulated that this group of compounds interferes with the electron transport chain of TB and thereby effectively stopping it in its tracks [2].

**Aim of Study:**

1. Demonstrate the level and nature of antibacterial activity of Australian *Drosera* species against *Mycobacterium smegmatis*

2. Compare metabolomic profiles of treated *M. smegmatis* against commonly used anti-TB agents to determine mechanism of action

**Methods:**

Bacterial growth will be assessed when challenged with varying concentrations of the carnivorous plant extract to determine the minimal inhibitory concentration of the plant extract. An optimum concentration and timepoint will be selected to determine the differential metabolomic profile of the control versus treated organism [3]. Subsequent experiments will assess what additional factors (eg diet, time of harvest, growth conditions etc) contribute to the antibacterial activity of the plant.

While *Mycobacterium tuberculosis* is the pathogenic strain in TB infection, the model organism, *M. smegmatis* will be used initially to its morphologic similarity, ease of handling and relative safety. Positive results can later be translated into problematic strains in subsequent experiments.

**Ethics Application Requirements:**

Appropriate Biosafety approval will be sought

**Key References:**
