

## **BSc [Hons] Projects for 2008**

### **Project # 1**

- **Title: An investigation of the immunomodulatory properties of *Astragalus membranaceus* using mouse as a model system**

*Astragalus membranaceus* is a Chinese medicinal plant has been claimed to act as a tonic to protect the immune system, improve the functioning of the lungs, adrenal glands and the gastrointestinal tract. In addition, it has also been claimed to increase metabolism, sweating, promotes healing and reduce fatigue. However no evidence for any of the above-mentioned claimed therapeutic value of the medicinal plant has been reported.

The aim of this project will be evaluate the immunomodulatory properties of this medicinal plant by obtaining experimental evidence to either support or reject the hypothesis that an “aqueous extract of this medicinal plant can stimulate both arms of the immune response using mouse as a model system”.

### **Project # 2**

- **Title: Comparative protective potential of aromatic-dependent mutant of *Bordetella pertussis* grown under iron-replete versus iron-starvation conditions**

*B. pertussis* has been shown to express unique outer membrane proteins when grown under conditions of iron starvation that are considered to be important for its pathogenicity *in vivo*. However, its role in protection against challenge infection has not been reported. This project is designed to identify any novel protein(s) expressed under conditions of iron-starvation as well the immunogenicity of the aromatic dependent mutant, a live attenuated vaccine candidate in the first instance, grown under conditions of iron starvation is enhanced using mouse as a model system.

### **Project #3**

**Title: Immunogenicity of pertussis toxoid delivered intradermally following encapsulation in nanoparticles**

Whooping cough, caused by *Bordetella pertussis*, is prevented by vaccination of infants with an acellular pertussis vaccine [aP] that contains 3-5 inactivated virulence factors of *B. pertussis* and is delivered, in combination with diphtheria and tetanus toxoids [DTaP], in 3-5 doses by deep intramuscular injections. This delivery mode, in addition to causing serious side reactions in a significant percentage of vaccinees, offers only medium term protection at best because of the inability or limited ability of the DTaP to induce cell-mediated immune [CMI] responses.

Pertussis toxin is one of the major secreted virulence factors of *B. pertussis* and hence is included in an inactivated form [pertussis toxoid (PTXoid)] in the DTaP. The aim of this project is to determine whether delivery of the potential protective antigens, encapsulated in a nanoparticle formulation, delivered intradermally will induce CMI using PTXoid a model antigen and mouse as a model system.

This project will be carried out in association with the School of Pharmacy.

**Dr T K S Mukkur, intended supervisor of the projects, can be contacted at [T.Mukkur@curtin.edu.au](mailto:T.Mukkur@curtin.edu.au)**