Department of Molecular and Cellular Biology

Graduate Seminar MCB*7500

Friday, June 8, 2018 in SSC 1511 @ 12 noon

presented by:

Steven Kelly

(Advisor: C. Whitfield)

"Characterization of O-Antigen Biosynthesis in *Klebsiella pneumoniae* and Exploitation in Immunogenic Glycoconjugates"

Klebsiella pneumoniae is a Gram-negative, opportunistic pathogen requiring new treatment strategies due to widespread antibiotic resistance. Cell surface polysaccharides are effective in generating active and passive immunity against some bacteria and the O-polysaccharide (O-PS) of lipopolysaccharide is considered a target in *K. pneumoniae*. O-PS is composed of diverse repeating sugar units and divides the *K. pneumoniae* species into distinct O serotypes. Passive immunization requires defined immunogens to generate therapeutic antibodies with defined specificity and glycoengineered conjugates are being considered for this purpose. This technology involves *in vivo* glycosylation of a carrier protein with the polysaccharide structure of choice in recombinant *Escherichia coli* hosts. To employ this technology, an understanding of the glycan structure and the genes required for its synthesis are important prerequisites. Effective immunotherapy for *K. pneumoniae* dictates a multivalent approach covering as many of the glycan structures found in clinical isolates as possible. Currently there are nine proposed *K. pneumoniae* O serotypes but, for a small subset, there are gaps in our understanding of the corresponding molecular determinants. My research goals are two-fold. First, I will establish the biosynthetic pathway for the serotype O2ac and O7 O-PSs, to help complete our understanding the molecular basis for O-PS diversity in *K. pneumoniae*. Then I will construct recombinant strains enabling the production of O-antigen glycoconjugates using well-characterized N-linked glycosylation systems.

■ *MCB Brown Bag Seminar*