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Application of glycan array analysis in the discovery of novel bacterial host interactions

Glycans are important structures in many host-pathogen interactions. Bacterial lectins such as adhesins and toxins exploit host glycans as targets. Host lectins recognize bacterial glycans in innate immune processes. The molecular details of many bacterial-host interactions remain to be discovered. Understanding these processes is a key for the development of novel strategies for prevention and therapeutics. We have applied glycan array to discover novel interactions between bacterial and human cells. Using the Institute for Glycomics glycan arrays comprising 400 different structures, we have discovered novel glycan targets for the archetypal cholesterol-dependent cytolysin toxins, pneumolysin and streptolysin O. Previously it had been believed that cholesterol rich membrane of host cells were the only receptor of these toxins. We report high affinity binding to glycan structures present on red blood cells. For example, streptolysin binds to lacto-N-neotetraose with a KD <1 nM. Binding to this structure is required for efficient red blood cell lysis by streptolysin O. Using similar approaches we have defined novel classes of bacterial and host lectins.

Biography

Michael P Jennings works in the fields of Glycobiology, Bacterial Genetics and bacterial Pathogenesis. His work has focused on bacterial pathogens in particular the pathogenic *Neisseria* (meningitis) and *Haemophilus influenzae*. He was awarded his PhD (1990) from Griffith University. His Postdoctoral Training was in the laboratory of Profesoor Richard Moxon at the University of Oxford 1992-1996 funded by the Beit Memorial Fellowship for Medical Research. In 1997 he took up a Faculty Position at the University of Queensland. He remained at University of Queensland until 2009 until he returned to Griffith University to take up the position of Deputy Director at the Institute for Glycomics.

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