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Prof. Renwick Dobson

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Ren is a Principal Investigator of the Biomolecular Interaction Centre based at the University of Canterbury (New Zealand) and until recently served as its director. His research focuses on the molecular interactions critical to biological function and has publications that span biochemistry and aligned disciplines such as engineering. He works with a group of six staff and 19 students on six general themes:

- How cells transport nutrients across lipid membranes
- Engineering new food systems
- Understanding and engineering enzymes
- Diagnostic assay and device development
- Transcriptional regulation
- Molecular interactions in plant/fungal infections (myrtle rust)

Their lab is funded by the Marsden Fund, Tertiary Education Commission, Ministry of Business, Innovation and Employment (MBIE), and Industry. He worked at the University of Melbourne as a CR Roper Research Fellow prior to joining University of Canterbury in 2012.

TRAPped in an elevator: amino-sugar uptake and utilisation by bacteria.

Sialic acids are a large group of 9-carbon amino sugars that are widely distributed among mammals and higher metazoans. They are usually found conjugated to exterior cell surfaces. Commensal and pathogenic bacteria that colonise heavily sialylated niches (e.g., the mammalian respiratory tract and gut) can scavenge sialic acid from their surrounding environment and use it as a carbon, nitrogen and energy source—that is, they eat your glycoconjugates for breakfast. Sequestration and degradation of sialic acid involves specific amino sugar transporters responsible for the import into the bacterial cell and 5 catabolic enzymes that successively degrade sialic acid. Sialic acid utilization is essential for a range of human pathogenic bacteria. In this talk, Prof. Dobson will present work that defines, at the molecular level, how **TR**ipartite **A**TP-independent **P**eriplasmic (TRAP) transporters import sialic acids in bacteria.

TRAP transporters that import sialic acids have two components: a soluble metabolite-scavenging protein (SiaP) and a membrane transport protein embedded in the cell membrane that comprises two subunits (SiaQ and SiaM). Prof. Dobson will report the cryo-EM structures of several sialic acid TRAP transporters at 3 Å resolution or better. Rather than a monomer, he finds that some TRAP transporter are homodimers. They observe lipids at the dimer interface, as well as a lipid trapped within the fusion that links the SiaQ and SiaM subunits. He shows that the affinity (KD) for the complex between the soluble SiaP protein and SiaQM in the membrane is in the micromolar range. This work provides key data that enhances our understanding of the 'elevator-with-an-operator' mechanism of TRAP transporters.