



SoMS, BABS and GSBE Cross-Faculty Seminar Series

The Split Personality of Glutamate Transporters: a Chloride Channel and a Transporter

Renae Ryan, School of Medical Sciences, University of Sydney

Abstract: Glutamate is the predominant excitatory neurotransmitter in the mammalian central nervous system and activates a wide range of receptors to mediate a complex array of functions. To maintain efficient synaptic signaling and avoid neurotoxicity, extracellular glutamate concentrations are tightly regulated by a family of glutamate transporters termed Excitatory Amino Acid Transporter (EAATs). Altered glutamate transmission, and specifically disrupted EAAT function, has been implicated in a range of disease states including; Alzheimer's disease, episodic ataxia, epilepsy, stroke, motor neuron disease and pain.

In addition to clearing glutamate from the extracellular space, EAATs can also function as chloride (Cl⁻) channels. The dual transporter/channel functions are mediated by distinct conformational states of the transporter and the Cl⁻ channel activity is thought to contribute to ionic/osmotic balance and can affect cell excitability. The EAATs use a unique mode of transport we have termed the 'twisting elevator' mechanism and we hypothesize that the Cl⁻ channel is activated during this twisting elevator movement. Our aim is to develop a model for the dual functions of the glutamate transporters through structural and functional analysis of human and prokaryotic glutamate transporters.

Bio: A/Prof Renae Ryan received her PhD from the University of Sydney in 2004. After working as a postdoctoral fellow at Columbia University and the National Institutes of Health in the USA, Renae returned to the University of Sydney and was appointed as Associate Professor in the Sydney Medical School in 2010. She leads a research team that investigates the molecular mechanisms of amino acid transporters and their role in diseases such as epilepsy, chronic pain and cancer. A/Prof Ryan is the Academic Lead for the Science in Australia Gender Equity (SAGE) Program at the University of Sydney and Chair of the Sydney Medical School Gender Equality Committee. She has received several prestigious awards and fellowships including a NSW Tall Poppy Award and an NHMRC Career Development Fellowship.

Date & Time: Wednesday 20th September at 4.00 pm followed by Happy Hour.

Venue: Lowy Cancer Research Centre, Level 4 seminar space [Map](#)

For information please contact: Kate Poole. **Email:** k.poole@unsw.edu.au

UNSW CRICOS Provider Code 00098G | ABN 57 195 873 179