

## Molecular insights into the regulation of T cell signalling

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T cell activation begins with the formation of signalling complexes at the cell surface involving the T cell antigen receptor (TCR), the Src family kinase Lck and the adaptor protein, linker for activation of T cells (LAT). How early TCR signalling events are regulated to prevent inopportune signalling in resting T cells but efficient activation upon receptor ligation is poorly understood. We have established single molecule localization microscopy to determine how TCR engagement reorganizes signalling proteins on the molecular scale. Imaging single molecules in intact cells has provided new insights into the mechanisms of Lck clustering (Rossy et al. *Nat Immunol* 2013) and LAT recruitment (Williamson et al. *Nat Immunol* 2011) upon TCR activation. We are now extending this work to elucidate how the membrane environment affects protein interactions (Owen et al. *Nat Commun* 2012) to better understand the molecular principles of TCR signalling regulation.

Bio

Professor Katharina Gaus is an NHMRC Senior Research Fellow at the University of New South Wales. She received her PhD from the University of Cambridge in 1999 and has led the Cell Membrane Biology group since 2005. She was awarded the Young Investigator Award from the Australia and New Zealand Society for Cell and Developmental Biology (2010) and the Gottschalk Medal from the Australian Academy of Science (2012).



### Recent publications

Rossy J, Owen DM, Williamson D, Yang Z, **Gaus K.** (2013) Conformational states of Lck regulate clustering in early T cell signalling. *Nature Immunol*, 14, 82-9.

Owen DM, Williamson D, Magenau A, **Gaus K.** (2012) Sub-resolution lipid domains exist in the plasma membrane and regulate protein diffusion and distribution. *Nat Commun.* 4;3:1256

Williamson D, Owen DM, Rossy J, Magenau A, Wehrmann M, Gooding JJ, **Gaus K.** (2011) Pre-existing clusters of the adaptor Lat do not participate in early T cell signaling events. *Nature Immunol*, 12, 655-662.