The secret life of immune cells – tracking cell migration in vivo using photoconversion and two-photon microscopy

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Dr Tatyana Chtanova graduated from the University of New South Wales with first class Honours in Biochemistry and Molecular Genetics in 1999. She was awarded her PhD in 2005 from UNSW for her thesis work on the identification of specific gene expression signatures for multiple T cell subsets, performed at the Garvan Institute. Following her PhD, she obtained a Human Frontier Science Program fellowship to train at University of California, Berkeley in the laboratory of Professor Ellen Robey. There she gained expertise in in vivo two-photon microscopy and used it to characterise, for the first time, neutrophil dynamics in vivo, and to identify a novel mechanism of immune evasion by pathogens via CD8 T cells.

Immune cell migration is critical to the success of most immune responses. While a lot of attention is focused on the steps involved in immune cell recruitment to primary sites of inflammation, the subsequent fate of these immune cells is often overlooked. We have established a photoconvertible transgenic system that allows us to label and track immune cells recruited to sites of inflammation.

This presentation will focus on two projects that utilise this system to uncover migration and fate of immune cells. The first project examines the fate of neutrophils recruited to bacterial and sterile lesions and how neutrophil migration influences adaptive immunity. The second project focuses on a previously overlooked aspect of immune cell migration in tumour responses.