**Date / Time:**
Tuesday, 2 August 2011
12.00 nn

**Venue:**
CeLS Auditorium
Centre for Life Sciences,
Level 1,
28 Medical Drive
Singapore 117456

**Convener:**
Dr Zhang Yongliang

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**“Peeking Into The Secret Life Of Neutrophils”**

**Dr. Ng Lai Guan**
Principal Investigator
Singapore Immunology Network, A*STAR

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**Abstract**

Polymorphonuclear neutrophils play a crucial role in the innate immune response and constitute the main defense against invading pathogens. However, they also contribute to collateral cell damage through the release of noxious mediators. Thus, the generation, mobilization and subsequent clearance of these cells are tightly regulated processes. We have made use of intravital multiphoton microscopy to study two important aspects of neutrophil biology, namely (1) the behavior of neutrophils in response to tissue injury in the dermis of mice; and (2) the role of CXCR2 and CXCR4 during G-CSF-induced neutrophil mobilization from the bone marrow (BM). From our intravital skin imaging study, we observed that, in response to injury, rare scouting neutrophils migrate in a directional manner towards the damage focus. This is then followed by the attraction of waves of additional neutrophils, and finally the stabilization of the neutrophil cluster around the injury site. In addition, we also found that BM neutrophils are sessile under physiological conditions, however within minutes of subcutaneous injection of granulocyte colony-stimulating factor (G-CSF), they become highly motile and migrate across the endothelium to enter the circulation. We demonstrate that this increase in cell motility is dependent on CXCR2. In contrast, disruption of the CXCR4 chemokine axis, which is important for the retention of neutrophils in the BM, is not sufficient to increase neutrophil motility. However, prior administration of AMD3100, an antagonist of CXCR4, dramatically increases G-CSF-induced neutrophil motility and mobilization from the BM. In summary, our studies demonstrate that the ability to visualize when, where and how neutrophils respond to stress signals *in vivo* offers a new perspective for understanding how neutrophil migration and mobilization is regulated in a tissue-specific context.

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**Selected Publications**


