

# SIgN Immunology Seminar

## Prof Arne Akbar

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The interplay between senescence and metabolism in regulating T lymphocyte function



### Host

Dr Anis Larbi  
Singapore  
Immunology  
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### Date

**Tuesday**  
**7 October 2014**

### Time

11am – 12pm

### Venue

SIgN Seminar  
Room  
Immunos  
Building  
Level 4  
Biopolis

As we age our immune systems decline: older people suffer from increased incidence and severity of both infections and cancer. In addition, vaccination becomes less efficient with age.

The Akbar Group has found that ageing in T lymphocytes is controlled by p38 MAPK which acts as a brake to prevent certain cellular functions. They found that this braking action could be reversed by using a p38 MAPK inhibitor, suggesting the possibility of rejuvenating old T cells using drug treatment. In recent study in *Nature Immunology* (Lanna A et al 2014) the group shows that p38 MAPK is activated by low nutrient levels, coupled with cell signals associated with senescence. It has been suspected for a long time that nutrition, metabolism and immunity are linked and this paper provides a prototype mechanism of how nutrient and senescence signals converge to regulate the function of T lymphocytes. In a second paper (Henson SM et al, J. Clin. Invest. 2014), the team showed that blocking p38 MAPK boosted the fitness of senescent T cells by improving the function of mitochondria and enhancing their ability to divide. This extra energy that was required for proliferation was generated by the recycling of intracellular molecules by the process of autophagy. This highlights the existence of common signalling pathways in old/senescent T lymphocytes that control their immune function as well as metabolism. This highlights the intimate association between ageing and metabolism of T lymphocytes, please view the video (<http://youtu.be/oQ-unC7D9i4>) . An important question is whether this knowledge can be used to enhance immunity during ageing. Many drug companies have already developed p38 inhibitors in attempts to treat inflammatory diseases. One new possibility for their use is that these compounds could be used to enhance immunity in older subjects. Another possibility is that dietary instead of drug intervention could be used to enhance immunity since metabolism and senescence are two sides of the same coin.