

24 September 2013

Press Release

Dampening the Flames of Inflammation - Cork scientists discover a new protective role for Natural killer (NK) cells in intestinal inflammation

Scientists at the Alimentary Pharmabiotic Centre (APC) have discovered that Natural Killer (NK) cells are major regulators of inflammatory bowel disease (IBD) in an experimental model of the disease. The research is published this month in the leading Nature scientific journal "*Mucosal Immunology*".

Natural Killer cells are white blood cells which act as "watchmen" or "sentries" protecting us against the development of tumours and viral infections. When a tumour or virus is identified, a vanguard of immune cells accumulates to attack the invader thereby causing inflammation. Because of this, APC scientists predicted that mice lacking Natural Killer cells would develop less inflammation in an experimental model for IBD. However, to their surprise, mice lacking Natural Killer cells developed severe acute inflammation. This was accompanied by severe signs of disease, accumulation of other immune cells called neutrophils and molecules which worsen inflammation and damage gut tissues.

"Our studies revealed that Natural Killer cells migrate to the gut as early as day 1 after onset of disease. In addition, these Natural Killer cells produce a vast amount of molecules which control the immune system. We have identified a new regulatory mechanism for Natural Killer cells in acute gut inflammation and a specific signal protein (killer cell receptor NKG2A) that can directly control neutrophil functions" said Dr Silvia Melgar, Investigator at the APC.

"This is an exciting discovery in Natural Killer cell biology. Our findings open up the possibility of new therapeutic approaches for IBD and other inflammatory diseases such as cystic fibrosis, rheumatoid arthritis and severe asthma, where neutrophil accumulation is a key feature" said Dr Lindsay Hall, first author of the study.

The study, funded by Science Foundation Ireland, was carried out by Lindsay Hall, Carola Murphy, Grainne Hurley, Aoife Quinlan, Fergus Shanahan, Ken Nally and Silvia Melgar at the Alimentary Pharmabiotic Centre. Dr Lindsay Hall is now a Lecturer in Gastrointestinal Science in the Norwich Medical School, University of East Anglia and a member of the Gut Health and Food Safety strategic research programme at the Institute for Food Research (IFR) in Norwich.

Reference: Natural killer cells protect mice from DSS-induced colitis by regulating neutrophil function via the NKG2A receptor *Mucosal Immunology* Issue 6(5):1016-1026 September 2013. The story makes the front cover of the issue.

<http://www.nature.com/mi/journal/v6/n5/full/mi2012140a.html>

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About the APC

The Alimentary Pharmabiotic Centre (<http://apc.ucc.ie>) is a national centre for food and medicine which recently received €50m funding from government and industry through Science Foundation Ireland's Research Centres' programme. The APC spans across UCC, Teagasc (Ireland's Agriculture & Food Development Authority) and Cork Institute of Technology. APC's research explores how bacteria in the human gut impact on population health, leading to the development of future foods and medicines.