

Scientists uncover protective influence of Vitamin A against inflammatory bowel disease

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Scientists at Trinity College Dublin have made novel discoveries around the protective influence of Vitamin A against the damaging immune responses that lead to inflammatory bowel disease. The research led by Professor of Experimental Immunology, Kingston Mills has just been published in the leading peer reviewed medical journal *The Journal of Experimental Medicine*.

Inflammatory bowel diseases (IBD) include Crohn's disease and [ulcerative colitis](#) and affect over 2 million people in Europe and more than 15,000 in Ireland. The diseases are characterised by inflammation and damage to the intestine caused by a combination of genetic and environmental factors. The damaging inflammation is mediated by immune cells that infiltrate the gut tissue and are activated locally by bacteria normally resident in our gastrointestinal tracts.

The main job of the immune system is to protect us from infection with disease-causing bacteria and viruses, but these responses must be tightly regulated in order to prevent them from causing damage from unwanted inflammation. However in certain individuals genetic or environmental influences can upset the balance leading to excessive inflammation and diseases, like IBD.

Professor Kingston Mills's research team at the School of Biochemistry and Immunology in the Trinity Biomedical Sciences Institute have

discovered that administration of retinoic acid, a dietary metabolite of Vitamin A, can protect mice against [intestinal inflammation](#). Intestinal inflammation is caused by immune cells in the gut that release inflammatory cytokines, such as IL-17 in response to [intestinal bacteria](#). Other anti-inflammatory cytokines, such as IL-22 have the opposite effect of suppressing inflammation and inducing tissue repair. Postdoctoral Fellows Lisa Mielke, Sarah Jones and Mathilde Raverdeau, working in Professor Mills's group have shown that retinoic acid turn on IL-22, and inhibits IL-17 from two [immune cells](#) types found in the intestine, called $\gamma\delta$ T cells and innate lymphoid cells (ILCs). The net effect of this intervention is to reduce the damaging effect of the gut bacteria and to promote recovery of the damaged tissue in the intestine.

Commenting on the significance of the findings, Professor Mills said:

"Our finding provide valuable new information on the 'ying and yang' of the immune system and how its dysregulation can lead to inflammatory diseases, such as ulcerative colitis and Crohn's disease. On a practical level it has confirmed the importance of Vitamin A-rich green and root vegetables in our diet, and how Vitamin A helps to promote a healthier gut by stimulating the production of protective molecules in a hostile gut environment."

More information: *The Journal of Experimental Medicine*.
jem.rupress.org/content/early/.../3/05/14/jem.20121588

Provided by Trinity College Dublin

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