

PRESS RELEASE

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## **A Gut Feeling About Pain: UCC Scientists Uncover Long-lasting Consequences of Early-life Antibiotic Use**

University College Cork scientists show that disturbance of gut bacteria in early-life with antibiotics may exert long-term consequences on pain pathways. Their research is being published in the September 26<sup>th</sup> Issue of the journal *Neuroscience*.

Over the past years it is becoming clear that the bacteria in your gut, known as the microbiota, play a clear role in health and disease. This has even been shown to extend to brain development and behaviour. The overuse of antibiotics especially in early life, thus affecting the composition of the gut bacterial population, is one of the major public health concerns of our time. Whether antibiotic usage has any long-term effects on gut-brain signalling is unclear.

Now scientists at the Alimentary Pharmabiotic Centre and Dept. Anatomy & Neuroscience in University College Cork, Cork, Ireland have shown that, at least in animal models, disturbance in gut bacteria produces long-lasting effects on visceral pain. Visceral or abdominal pain is a very common symptom of disorders such as irritable bowel syndrome (IBS). IBS is the most common functional gastrointestinal disorder referred to gastroenterologists and has an unknown cause. Prof. John Cryan and Dr. Siobhain O'Mahony, together with their PhD student Valeria Felice and their colleagues have unravelled a novel mechanism underlying how visceral pain can emerge. Using two different antibiotic strategies they showed that animals whose gut microbiota was disturbed in early-life had increased pain responses in adulthood, even though the composition of the gut bacteria had long normalised. Notably the effects were specific to pain pathways as no effects on anxiety or learning were observed.

Prof. Cryan, says "*we are very excited about these data as they give fundamental insight into the mechanisms underlying visceral pain and clearly identifies the early-life period as one critical for microbe to brain signals*". Although the data clearly offer a cautionary note to the over-use of antibiotics in children Prof. Cryan says "*that the good news is that the effects seem somewhat selective to pain pathways and failed to affect anxiety or learning which may be some consolation for parents*". Dr O'Mahony says "*the data may also have implications for our understanding of infantile colic which is akin to IBS in its symptoms and is also thought to be due to misguided gut to brain signalling*".

The research was supported by Science Foundation Ireland through a Centre grant to the APC. The research was co-authored by APC researchers at UCC, Ken Nally, Helene Savignac, Marcus Claesson, Paul Scully, Jerzy Woznicki, Niall Hyland, Fergus Shanahan, Eamonn Quigley, Julian Marchesi, Paul O'Toole and Ted Dinan

*The research is published in the journal Neuroscience "O'Mahony SM, Felice VD, Nally K, Savignac HM, Claesson MJ, Scully P, Woznicki J, Hyland NP, Shanahan F, Quigley EM, Marchesi JR, O'Toole PW, Dinan TG, Cryan JF. Disturbance of the gut microbiota in early-life selectively affects visceral pain in adulthood without impacting cognitive or anxiety-related behaviors in male rats. Neuroscience. 2014 Sep 26;277:885-901".*

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### **About APC**

The Alimentary Pharmabiotic Centre, (APC; <http://apc.ucc.ie>) is a research centre funded by Science Foundation Ireland and industry partners. The APC, a partnership between University College Cork, Teagasc, the Irish Agriculture and Food Development Authority, and the Cork Institute of Technology, focuses on research in gastrointestinal health. APC's research focuses upon the magic and mysteries of the gastrointestinal bacterial community (the microbiota). The microbiota is not only a target for treatment and prevention of disease, it is a repository for functional food ingredients, new drugs and biomarkers of disease. Over the past 10 years APC scientists have related food and microbial diversity with health, have discovered new anti-microbials and anti-inflammatories and developed templates for future foods. Pharmabiotic is a neologism devised by the APC to represent any material (including molecules and microbes) originating from the gut ecosystem that can be exploited for a health benefit, and includes probiotics, prebiotics, metabolites, and potential new anti-microbials and anti-inflammatories. The independent international ratings agency Thomson Reuters Science Watch global

analysis, has ranked University College Cork at number 2 in the world for probiotics research, due primarily to publications from researchers in the Alimentary Pharmabiotic Centre (<http://sciencewatch.com/ana/st/probiotics/institution/>)