

## GlaxoSmithKline to establish a major drug discovery collaborative research project with the APC

Minister for Enterprise, Trade & Employment, Micheál Martin TD, recently announced that GlaxoSmithKline (GSK) is establishing a ground-breaking research project into gastrointestinal diseases, in collaboration with the APC in UCC.

This project is jointly supported by IDA Ireland and Science Foundation Ireland (SFI) and will involve an investment of up to €13.7m.



Mr. Micheál Martin TD, Minister for Enterprise, Trade and Employment

Researchers from GSK's Neurology and Gastrointestinal (GI) Centre of Excellence for Drug Discovery (CEDD) will work closely with the APC to identify new drug targets for the treatment of inflammatory bowel disease (IBD) and irritable bowel syndrome (IBS) by exploiting the drug discovery capabilities of GSK and the APC's unique understanding of these diseases.

Speaking at the launch in UCC, Mr. Micheál Martin TD, Minister for Enterprise, Trade and Employment said: "This internationally novel and exciting research project involves a high-level collaboration between GSK, one of the world's leading pharmaceutical companies, and one of Ireland's leading research groups, the APC. Ireland has created a unique interconnected R&D landscape that encourages collaboration between all participants in research."

Jackie Hunter, Senior Vice President and Head of GSK's Neurology & GI CEDD said, "GSK is committed to developing new medicines for the treatment of GI diseases. This collaboration is a concrete example of how industry and academia can partner effectively to translate preclinical research into medicines for GI disorders."

Professor Fergus Shanahan, Director of the APC, said: "This collaboration highlights the capability of Ireland's researchers to engage and add value to the earliest part of the pharmaceutical value chain in drug discovery, and encourages the pharmaceutical industry in general to consider Ireland as a location of choice for cutting edge research activities."



Pictured are Professor Fergus Shanahan, Director, APC & Dr Jackie Hunter, Senior Vice President and Head of GSK's Neurology & GI CEDD

## APC Public Forum APC BRINGING SCIENCE TO SOCIETY

Lecture Theatre G02  
Brookfield Health Sciences Complex  
College Road  
University College Cork

Tuesday, 30th January 2007, 7.30 – 9.00pm

**ALL WELCOME - ADMISSION FREE**  
See website for more details: <http://apc.ucc.ie>

## Front Cover News

Paul O'Toole and his colleagues have recently published a very important paper about the genome of one of our probiotic bacteria *Lactobacillus salivarius* subsp. *salivarius* UCC118, which has been extensively studied in human trials and animal models. The APC scientists have shown that besides the bacterial chromosome, there exists a large megaplasmid (very large circular piece of DNA) and two smaller ones. Megaplasmsids like this have not been seen before in this type of bacterium. This megaplasmid is very important for the probiotic properties of the bacteria, as it has been shown to encode the genes for the antibacterial compound ABP 118, (which is effective against many bacteria including methicillin resistant *Staphylococcus aureus* (MRSA)), metabolic capabilities and other genes directly related to gastrointestinal tract survival and competitiveness. The existence of megaplasmsids may also provide a mechanism to allow organisms to adapt to different environments.



Pictured are Drs Paul O'Toole, Douwe van Sinderen and Marcus Claesson

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Coláiste na hOllscoile Corcaigh, Éire  
University College Cork, Ireland



# InsideOut

Welcome to our second newsletter for patients and professionals in the medical community. Since the last issue was published in March 2006 we ran a very successful Irritable Bowel Syndrome (IBS) Patient Open Day.

Over 150 people attended and had the opportunity to hear Professor Eamonn Quigley, Professor of Medicine and Human Physiology, University College Cork (UCC), Consultant Gastroenterologist, Cork University Hospital (CUH) and Principal Investigator, Alimentary Pharmabiotic Centre (APC) provide an update on IBS research and clinical trials at the Alimentary Pharmabiotic Centre.

By popular demand this event travelled to the Education and Research Centre, St. Vincent's University Hospital, Dublin on Tuesday 17th October. Professor Diarmuid O'Donoghue, Consultant Gastroenterologist and Ms Naomi Bates, Senior Dietitian, both from St. Vincent's University Hospital, joined the APC team in providing a very informative and enjoyable evening.





Pictured are Professor Eamonn Quigley, UCC & Ms Shirley Beattie, CUH

To celebrate World Digestive Health Day the Alimentary Pharmabiotic Centre (APC) organised an Open Day for patients and their families to help unravel some of the mysteries of Irritable Bowel Syndrome (IBS).

Speakers included Professor Ted Dinan, Professor of Psychiatry at UCC and CUH, who discussed his research on communication patterns between the brain and the gut in IBS sufferers. Dr Liam O'Mahony, a scientist at the APC, discussed the involvement of the immune system in IBS. Shirley Beattie a Senior Dietician at CUH talked about how food can affect this condition and Phil Hahnel, Clinical Research Nurse for Alimentary Health, explained the process of clinical trials. Representative from the Irish Society for Colitis and Crohn's disease, Elizabeth Lattimore, communicated the benefits of a patient support network.

IBS is a profoundly disabling disorder that affects 15-20% of the population, impacting on every aspect of patients' lives. The main feature of the condition is abdominal pain or discomfort, which is associated with an alteration in bowel pattern, which can be one of diarrhoea or constipation but the majority of patients alternate between both. The condition is more common in women than it is in men and so far attempts at determining its biology have proved largely unsuccessful. About one in three cases occur following a gastrointestinal infection. For some patients, the trigger is a stressful life event and undoubtedly, for many sufferers, whilst stress may not be the cause of the disorder, it contributes to the duration of symptoms.

No new therapies for treating the disorder have been licensed in Ireland in recent years. One of the more promising lines of therapy is the use of probiotics. Professor Quigley and his colleagues within the APC have shown that a bifidobacterium is effective in treating all of the symptoms in a significant number of patients in a well-designed controlled study in which some patients were treated with placebo and others with the UCC bifidobacterial strain. The study clearly demonstrated the benefits of the latter.

A summary of the Open Day and audio recording of the days proceedings can be downloaded from the APC website at <http://apc.ucc.ie>

## Food – what should I eat?

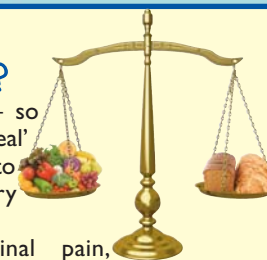
When it comes to diet and IBS – so what can you eat? There is no 'ideal' diet which will help to bring relief to all IBS sufferers. Advice will vary depending on the symptoms.

Symptoms range from abdominal pain, excessive gas production, bloatedness, diarrhoea, constipation, heartburn and sensation of incomplete evacuation. It is essential for all IBS sufferers to carry out a dietary assessment, which would include a 7-day diary, recording food intake and symptoms, thereby determining what foods cause the onset of which symptoms.

Fibre is divided into two types, soluble and insoluble and your symptoms should determine which type you should consume. Soluble fibre can be found in oats, pulses, fruits and vegetables and aids with constipation and diarrhoea. It is linked with the increase in the growth of bacteria found naturally in the gut by slowing down the transit of food through the stomach and intestines. Insoluble fibre can be found in whole-wheat cereals, wholemeal breads & brown rice. Insoluble fibre absorbs water and acts as a bulking agent in food, however too much can cause excessive wind and bloating. Reducing the amount of insoluble fibre consumed can help when diarrhoea is the prominent symptom, however once the symptoms settle, it is recommended to gradually re-introduce some high fibre foods to help find your tolerance level or to identify the culprit food. This is a process of trial and error that often is as individual as the person themselves.

It is advised to drink at least 8-10 glasses of water (diluted fruit juices or herbal teas) everyday, and more is recommended if consuming a high fibre diet. Limit your intake of caffeine by, where possible, substituting with decaffeinated options. In addition to caffeine, spices, carbonated drinks and foods high in fat can trigger IBS symptoms, as they are gastric irritants, which stimulate the bowel and can make diarrhoea worse. Other factors which should not be ignored when dealing with IBS are wheat, lactose, sorbitol and alcohol intake, as well as stress.

There may be several causes of IBS, and the range of symptoms will vary from person to person. There are a wide variety of approaches in the treatment of this common condition. Making changes to diet is one area to consider. Try to eat a regular, healthy diet and see if any of the changes suggested may help to make your symptoms more manageable.



## Profile: Brian Jones – Researcher

After completing my PhD at University of Wales Cardiff, I moved to Cork to work at the Alimentary Pharmabiotic Centre (APC) at UCC. I was surprised to learn the diversity of bacterial species living in the human gut and the important functions they perform in human health and disease. The human intestinal tract contains more than a thousand different species of bacteria, and may harbour up to one hundred trillion individual bacteria. So what are they doing there, and are they good or bad?



My current research is directed towards finding out exactly what these bacteria are doing. Many bacteria that colonise our guts have evolved with us for millions of years and have adapted to perform functions that benefit us, such as producing important vitamins, preventing colonisation of the intestine by harmful microbes, and helping ensure that our immune systems function properly. On the other hand, some functions of the gut microbiota may also be involved in disease. For example, recent research has suggested that disruption of this complex ecosystem and a reduced diversity in some species is involved in inflammatory bowel diseases (IBD), such as Crohn's disease. For other diseases, such as colon cancer, some functions of the gut microbiota may be carcinogenic, while others may have the opposite effect and reduce the risk.

The main focus of my research is identifying some of these products, and by understanding the mechanisms involved we hope to develop strategies that will allow us to encourage beneficial functions of the gut bacteria and inhibit those that may lead to diseases such as IBD and colon cancer. A major difficulty in studying the gut microbiota is that we can't grow many of these gut bacteria in the laboratory, which makes it very difficult to find out what they are doing. To get around this problem we are using a technology called metagenomics. This allows us to look at the functions performed by the gut microbiota without the need to grow all these species in the lab. This method involves extracting the DNA from all the different bacterial species and breaking it up into small fragments. These fragments are then kept inside the cells of a bacteria that we can grow easily, in this case *E. coli*, to generate a genetic "library" of DNA fragments. Each "book" in this library can then be read to identify a function encoded by the gut microbiota.

The ultimate goal of my research, as well as one of the main aims of the APC, is to understand how these bacteria affect our health and develop ways to control this in order to treat diseases such as Crohn's disease and colon cancer, as well as understanding how functions of these bacteria can be harnessed to improve health generally.