



Alimentary Pharmabiotic Centre
Mining Microbes for Mankind

GUT REACTION

NEWSLETTER OF THE ALIMENTARY PHARMABIOTIC CENTRE

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WELCOME

“**Delivering the Smart Economy**” the latest report on Science Technology and Innovation investment summarises the research activity in the Irish State which is key to the Government’s approach to the development and progress of a competitive knowledge economy. Eight Government departments, advisory bodies, state agencies and higher-education institutions have worked together to successfully implement the strategy. The €2.6 billion spent on R&D in 2008 is equivalent to 1.66pc of the Gross National Product (GNP). A target has been set of achieving a national R&D investment

target of 3pc of GDP. Full implementation of this strategy will be a key driver for future growth, employment and prosperity.

The Alimentary Pharmabiotic Centre (APC) is one of ten research centres in Ireland funded, in part, by Science Foundation Ireland and dedicated to advancing Ireland’s Smart Economy through cutting-edge research. In this issue of Gut Reaction, we report on the licensing of a new antibiotic, Thuricin CD to Alimentary Health Ltd, the foundation industry partner of the APC. Licensing Irish-owned new technologies such as Thuricin CD is one of the success stories that will help to deliver on the Government’s objective to develop a Smart Economy in Ireland.

Fergus Shanahan, Director

APC licenses Thuricin CD, a novel antibiotic effective against *C. difficile*, to Alimentary Health

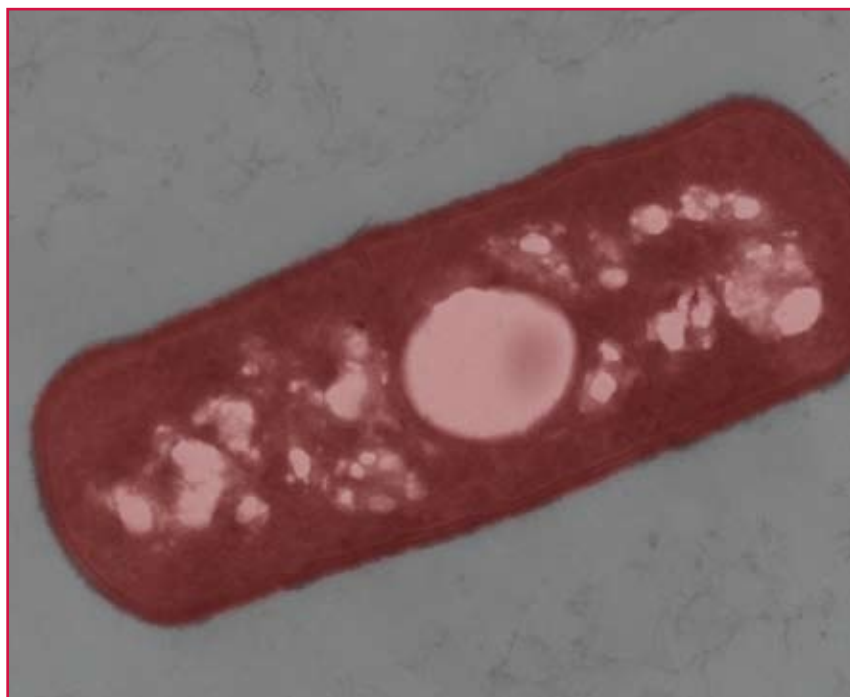
Thuricin CD, a novel naturally occurring antibiotic, has been licensed by the Alimentary Pharmabiotic Centre (APC) to the Irish biotechnology company Alimentary Health Ltd.

Researchers at the APC discovered the potent new antibiotic peptide by screening over thirty thousand bacteria isolated from the human gut. Thuricin CD kills a wide range of clinical *Clostridium difficile* isolates including all of the strains that are most commonly associated with serious human disease (001,106, NAP1/027) but does not harm beneficial bacteria in the gut.

Clostridium difficile causes the most rapidly rising hospital-acquired illness in the Western world and is a major cause of death, particularly in the elderly population. The *C. difficile* bacterium infects the gastrointestinal tract, producing toxins which can cause symptoms ranging from mild diarrhoea to life-threatening conditions. An estimated 3 million cases of *C. difficile* associated disease (CDAD) and colitis occur annually in the US. In the UK there were 8,324 deaths attributed to *C. difficile* in 2007. In Ireland, *C. difficile* has been a notifiable disease since May 2008, and in the year from July 2008 to June 2009, there were 2,359 reported cases of *C. difficile* in Irish health care settings. Scientists in Cork have reported the detection of the organism in approximately 10% of elderly inpatients. Current antibiotic-based therapeutic strategies have several shortcomings including increasing rates of clinical failure and colectomy, high rates of recurrent disease, emergence of new toxigenic strains causing epidemic disease, and selection of vancomycin resistant enterococci. Moreover, these therapies, unlike thuricin, also cause collateral damage by killing many of the beneficial gut bacteria. Consequently, the specificity of thuricin towards *Clostridium difficile* is a key advantage it has over current antibiotic treatments.

Under the terms of the License Agreement, Alimentary Health have negotiated an exclusive license to the Thuricin CD technology. In exchange for the licence, financial benefits will accrue to UCC and Teagasc.

Dr Barry Kiely, CEO of Alimentary Health Ltd, said “Thuricin is an important discovery in the search for new therapies to combat *C. difficile* infection and its development will receive significant focus from Alimentary Health in the coming years.”



RESEARCH UPDATE

From Paul Cotter



New metagenomic-based approaches are enabling researchers to gain a better appreciation of the complexity of the natural microbiota from environments ranging from rainforest soil to the bottom of oceans. However, perhaps the most important application of these technologies will be to study in depth the natural bacteria that are present in the human

gut and to determine how shifts in these populations impact on our health. This technology overcomes the disadvantages of previous approaches which relied on our ability to grow these bacteria on agar plates in the laboratory, which, in the case of many gut bacteria, is not possible.

The ability of researchers in the APC to carry out research in this area will be made much easier with the installation of a new 454 GS FLX DNA sequencer (the first such state-of-the-art DNA sequencer to be located in Ireland). This facility will be managed by Paul Cotter, a newly appointed APC Principal Investigator, who has been a Principal Research Officer at the Teagasc Moorepark Food Research Centre in Fermoy since February 2009. Paul was appointed to this position after having spent a number of years at University College Cork as a Principal Investigator and lecturer there and at Cork Institute of Technology. Paul's new role sees him leading Teagasc's new metagenomic-related projects which, in addition to focusing on gut health, also relate to the investigation of the microbiota present in a variety of foods.

Paul also continues his research on a class of antimicrobials known as bacteriocins which have attracted interest from the food, medical and veterinary industries. In addition to investigating a number of existing bacteriocins, Paul, working closely with colleagues Colin Hill and Paul Ross, is constantly searching for new and even better bacteriocins using traditional and robotics-based screening strategies and bioinformatic searches. More recently, bioengineering is being used to make good bacteriocins even better.

PROFILE - Sheila Morgan



Sheila is a familiar face at outreach events and is pictured here interacting with a member of the public at a Teagasc Open Day, promoting APC research and activities.

Sheila Morgan has been part of the APC since its foundation in 2003. She is based in the Biotechnology Department at the Teagasc, Moorepark Food Research Centre. Sheila, a graduate of NUI Maynooth, came to Moorepark in 1990, to do a PhD which was jointly supervised by Colin Hill and Paul Ross.

Sheila's research background is primarily in antimicrobials and she has published in journals ranging from the Journal of Applied Microbiology to Antimicrobial Agents and Chemotherapy. Over the last number of years Sheila's role has moved more from laboratory based research into the arena of scientific administration/management. On any given day Sheila can be found in the office, the laboratory or involved in trials in the Moorepark Technology Pilot plant!! Her role is diverse, and in addition to contributing to the APC she also participates in the Food for Health Ireland Programme and indeed a number of other projects. Sheila represents Teagasc on the APC Education and Outreach Committee.

Irish Gastroenterology & Immunology expertise highlighted at Digestive Disease Week 2009

Enterprise Ireland hosted a very successful symposium at Digestive Disease Week (DDW) 2009 in Chicago, the world's largest gathering of physicians and researchers in gastroenterology, hepatology, endoscopy and gastrointestinal surgery. The symposium on "The Host Microbe Interface – Translating Science To Real And Emerging Therapeutic Opportunities" featured presentations and remarks from recognised world leaders in their fields including APC's Eamonn Quigley and Fergus Shanahan.

Enterprise Ireland's DDW booth showcased Irish companies Alimentary Health, Opsona Therapeutics, AGI Therapeutics (AGI), Sigmoid Pharma, Pharmatrin, Vysera Biomedical and Cellix. Enterprise Ireland is the government agency responsible for the development and promotion of the indigenous business sector.

Entrepreneurship – how to create a technology start-up

The key elements required to start a technology company – either biotech or hi-tech – were the focus of an APC conference in June 09. The event aimed to stimulate the research community to take their research to the next level, and commercialise their findings for the benefit of Ireland and society at large. Approximately 200 people attended, many with science/technology backgrounds including PhD students, postdoctoral fellows, lecturers and members of the business community

The theme of the one day event was the four pillars of success for a successful start-up: Technology, Market, Team and Finance. Cormac Kilty, founder and CEO of Biotrin introduced the four pillars, while Chris Horn, Founder and Vice-Chairman of Iona Technologies and a serial entrepreneur, delivered the keynote address on Entrepreneurship and Innovation. Keith O'Neill, Director, El Bio discussed the importance of Entrepreneurship to Ireland's Smart Economy.

The four themes of the Conference were further developed in Case Study presentations from a number of Irish biotechnology and hi-tech start-up companies including Cellix, SensL, Nualight and Sigmoid. John McManus, NovaUCD advised on Technology and Market Opportunities for new ideas while Joey Mason from Delta Partners spoke about "Building the Right Team". The subject of financial support was addressed by Christian Stafford from El and UCC, Josette O'Mullane from the Genesis programme in CIT and Ena Prosser from Fountain Healthcare Partners. Frank Walsh from Enterprise Equity outlined the key features of a business plan.

Presentations from the event are available on <http://apc.ucc.ie>



Pictured at the event are Chris Horn, Fergus Shanahan and Cormac Kilty.

Fergus Shanahan awarded "David Sun" Lecture



American College of Gastroenterology President, Eamonn Quigley, presenting a plaque to Fergus Shanahan on the occasion of his delivering the "David Sun Lecture"

This year's David Sun Lecture has been awarded to Fergus Shanahan, MD, FACP, who presented his talk "Gut Microbes: From Bugs to Drugs" to an audience of approximately 3,000 people in San Diego. Held during the American College of Gastroenterology Annual Postgraduate Course, The David Sun Lectureship in Postgraduate Education was established by Mrs. Sun in memory of her husband, Dr. David Sun, an outstanding gastroenterologist and investigator. The Lecturer, with a distinguished background in gastroenterology or an allied field, is chosen by the Course Directors of the Postgraduate Program subject to the approval of the Educational Affairs Committee and the Board of Trustees

Launch of APC Phase II



Pictured at the launch are Maurice Wolridge, Chairman, Alimentary Health Ltd, Conor Lenihan, Minister for Science, Technology and Innovation and Jan Raaijmakers, GlaxoSmithKline VP External Scientific Collaborations Europe.

Minister for Science, Technology and Innovation, Conor Lenihan T.D. officially launched Phase II of the APC at the Glucksman Gallery, University College Cork on 11th September, 2009. During his visit, Minister Lenihan met with UCC and Teagasc based researchers as well as with representatives of Alimentary Health Limited and GlaxoSmithKline. "I am greatly heartened by the proactive partnership shown in recent years by SFI funded researchers across its portfolio of research initiatives, and I would urge that this collaborative, 'Smart Economy' approach continues. The APC is an excellent example in this regard and I am confident we will witness further tangible economic outputs in the course of APC's research over the coming years." Minister Lenihan added.

Staff Awards



Pictured are Fergus Shanahan, APC, Brenda Egan, Abbott, Dervla O'Malley, APC, Declan McKiernan APC, John Hyland, President ISG, Jane McCarthy, Mercy University Hospital and Peter Cassidy, Abbott.

APC researchers Dervla O'Malley and Declan McKiernan won first prizes for the best Oral and Poster presentations (respectively) at the Irish Society of Gastroenterology Summer Meeting in Killarney.



Professor Gregory Provan, Computer Science, UCC, Mr Jun Wang, Ms Fang Fang & Dr Paul O'Toole, Microbiology Department, UCC

APC researcher, Fang Fang won a prestigious award from the Chinese Government for being an outstanding PhD student.



Congratulations to Professor Colin Hill on his election to the Royal Irish Academy, the highest honour available to a scholar or scientist working on the island of Ireland.

Nine APC PhDs Awarded

Congratulations to: Ger Clarke, Evelyn Clayton, Fang Fang, Alan Hennessy, Ian Monk, Caitlin O'Mahony, Karina Pokusaeva, Eva Rosberg and Debbie Watson.



Catherine Stanton and her husband, Paul Ross, became the first ever couple to be conferred simultaneously with a Doctorate of Science (DSc) from the National University of Ireland (NUI). The DSc is the highest academic honour awarded by the NUI and is based on consistent excellence in scientific research in a specific area. Catherine and Paul are based at the Teagasc Food Research Centre in Moorepark, Fermoy and are Principal Investigators in the APC and in the Food for Health Research Centre (FHI).

Upcoming Events

APC Public Forum

Microbes and Mankind
- how bacteria and viruses shape humanity
Thursday 12th November 2009
7.30-9pm
Lecture Theatre G01
Brookfield Health Science Complex,
University College Cork
All Welcome



Visit the APC Stand at
Discovery 2009
City Hall Cork
14-18 November 2009
ALL WELCOME

Paul Ross appointed Head of Food Research at Teagasc

Teagasc appointed Paul Ross as Head of Food Research in July. As head of Food Research, Paul has responsibility for providing overall leadership for the Teagasc food research and innovation programme which is delivered at two research centres - Moorepark in Cork and Ashtown in Dublin, has a budget of €18 million and is designed to meet the research and innovation needs of the Irish food industry. It covers areas of food safety, foods for health, food ingredients, food cultures, meat research, dairy technology and prepared foods. In addition Paul has responsibility for the day-to-day management of Moorepark Food Research Centre and joins the board of Moorepark Technology Limited, a joint venture pilot plant, which offers facilities and services to companies in the food industry to scale up research and new product testing.



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