



Alimentary Pharmabiotic Centre
Interfacing Food and Medicine

GUT REACTION

NEWSLETTER OF THE ALIMENTARY PHARMABIOTIC CENTRE

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WELCOME

It is almost 5 years since the Alimentary Pharmabiotic Centre (APC) was first launched, and our metrics of performance, which we continually evaluate, are worthy of comment. Our cumulative publication rate has exceeded 400 full papers, many of which were funded directly from the original SFI-funded Centre grant, and others from additional sources of funding. More importantly, the publication rate for each research core shows a progressive upward trend with cross-core collaboration. The impact of the publications is reflected by the fact that 10-15 papers were showcased on

journal covers or attracted an editorial comment. The APC is also within target for international norms for economic and intellectual property generation. However, it is human capital development that we value the most and it is gratifying that almost all of the people who have left the APC have gone on to senior positions in industry or academia. Our desire is to sustain an environment where all can fulfil their potential, and to generate confidence that allows people to be ambitious – to think big! To that end, I salute the APC people and their accomplishments, highlighted in this issue of GUT REACTION.

Fergus Shanahan, Director

EXPANDING INDUSTRY LINKS

Alimentary Health Ltd, generates its first royalty payment for the State

Alimentary Health Ltd. has recently generated its first royalty payment for University College Cork. Alimentary Health is a speciality biotechnology company founded in 1999 by UCC academics from departments within the College of Science Engineering and Food Science and College of Medicine and Health with the support of Enterprise Ireland. Alimentary Health Ltd. is focused on the isolation, characterisation, clinical evaluation and commercialisation of probiotic bacteria for inflammation and infectious conditions. It continues to invest in basic and applied research in Ireland and is one of the foundation partners in the Alimentary Pharmabiotic Centre.



Alimentary Health Ltd. CEO, Dr. Barry Kiely said that “the establishment of the university-based campus company was the bridge to enable Irish scientists to translate their ideas to products in a global marketplace.” In this case, the early work of the Company attracted the interest of the global giant Procter and Gamble Co., which ultimately partnered with Alimentary Health to launch the product Align™ in the United States. Align™ is a probiotic product for intestinal symptoms and is based on original research by scientists in Cork.

The royalty payment is testimony to the success and value of investment in university campus spin-out companies such as Alimentary Health Ltd. Brendan Cremen, Director of Technology Transfer at UCC said “while the royalty income is welcome, the true value of the research is not in royalties per se but rather in the market/business expansion of indigenous industry”.

Profs Fergus Shanahan and Gerald Fitzgerald concurred - “the principal value to Ireland of SFI-funded research centres, such as the APC, is development of human capital, but royalty income and indigenous industry expansion represent tangible evidence of the wisdom of Government’s investment in a knowledge economy.”

RESEARCH UPDATE

from Mary Rea

Targeting *Clostridium difficile*: Using Good Bugs to Kill Bad Bugs



Clostridium difficile has recently moved from relative obscurity to being the hospital 'super bug' of the 21st century. Healthy humans can harbour *C. difficile* without ill effects. However, administration of antibiotics can lead to perturbation of the gut flora allowing *C. difficile* to proliferate and produce two potent toxins (A and B, an enterotoxin and a cytotoxin respectively) which cause symptoms ranging from mild diarrhoea to life threatening pseudomembranous colitis (PMC). The elderly and people with impaired immune function are particularly susceptible. Because *C. difficile* is a spore-forming bacterium it survives for long periods in the environment and is extremely persistent in environments such as hospitals and nursing homes. Currently there are ~40,000 *C. difficile*-associated disease (CDAD) cases in the UK in people 65 and over. In Ireland CDAD became a notifiable disease, under the Acute Infectious Gastroenteritis Disease (AIG) category, from May 4th, 2008.

APC scientists are investigating bacteriocins (peptides produced by one bacterium that kill other bacteria) as alternatives to the currently used antibiotics vancomycin and metronidazole. Human faecal samples were screened for bacteria that could produce antimicrobial compounds which would kill *C. difficile* without affecting the beneficial bacteria in the gut. One out of thirty thousand bacterial colonies screened was found to produce a potent antimicrobial compound. This bacteriocin has been shown to be composed of two peptides which act together inhibiting all *C. difficile* strains tested to date including the ribotypes commonly associated with CDAD. Furthermore in vitro studies have shown that this compound does not affect probiotic strains of *Lactobacillus* or *Bifidobacterium*. This bacteriocin can be purified in the laboratory and work is ongoing to investigate its structure and mode of action with a view to it assessing its potential as a novel therapeutic for the treatment of CDAD.

PROFILE - Silvia Melgar

Silvia Melgar joined the APC in January 2008 as the Research Coordinator/Principal Scientist within the IBD-exploratory group under the GSK-APC collaboration. Silvia coordinates in vivo work aiming to develop new models for IBD, validate new pre-clinical drugs, promote early target evaluation and interact with the existing IBD-group in GSK Immune Inflammation CEDD, Stevenage, UK. Silvia is also interested in investigating host-bacterial interactions in experimental models of colitis with other scientists in the APC.



Silvia was born in El Salvador and moved to Sweden in the late 1980s, where she received a BSc degree in Molecular Biology in 1995 and PhD in Immunology in 2002 from the Umeå University. During her PhD, Silvia investigated the function of human intestinal T lymphocytes in healthy compared to the inflamed intestine of IBD patients. In 2002, she joined the IBD group at AstraZeneca R&D Mölndal, Sweden, as a post doctoral fellow and in 2005 she became a Senior Research Scientist. During her time at AstraZeneca, her immunological understanding expanded from human cells to whole animal interaction and focused on development and evaluation of different in vivo models for IBD, biomarkers e.g., cytokines and imaging technologies e.g., magnetic resonance imaging, to supplement target identification and validation and pre-clinical discovery programs.

In her spare time Silvia enjoys theatre, visiting museums and art galleries and travelling.

Trevor Sargent meets with NUI Cork, Diploma in Speciality Food Production



Photo legend: Professor Patrick Fitzpatrick, Head of College of Science, Engineering and Food Science, UCC; Ms Denise Keohane, Food Industry Training Unit, UCC; Trevor Sargent T.D., Minister of State for Food and Horticulture; and Dr Seamus O'Reilly, Department of Food Business and Development, UCC.



Willem de Vos awarded Spinoza Prize

We are delighted to congratulate Professor Willem de Vos, a member of the APC's Scientific Advisory Board who has been awarded the 2008 Spinoza Prize. The Spinoza prize is the largest Dutch award in science. Each researcher receives €1.5m to freely devote to his or her research. Researchers receive the prestigious prize for their outstanding, pioneering and inspiring scientific work.

2008 Cook County - Illinois BIO Mission



PHOTO shows L-R: Fergus Shanahan, Director APC, Dr Michael Murphy, President, UCC, Lieutenant Governor Pat Quinn, and Cork County Manager, Martin Riordan.

A delegation including the Lieutenant Governor of the State of Illinois, Pat Quinn, recently visited the APC as part of a three-day visit to Cork for a business networking event.

During the course of the UCC visit, the group also held meetings with the IDA and Enterprise Ireland. Professor Alan Kelly, Dean of Graduate Studies, UCC led the group on a tour of the Food Processing Unit and Microbrewery. A round-table meeting with SME's (Cybercolloids, Deoxy Ltd., Cybercolors Ltd., Celtic Sea Minerals, and Alimentary Health Ltd.) followed. Senior managers from industry also met the delegation. The delegation also visited Moorepark Food Research Centre. The US Mid-West is home to the third largest concentration of bio-tech industries in America, hence the Illinois region presents very significant market opportunities for Cork companies.

Debating..... Science Issues

Ballincollig Community School (BCS), Co. Cork, became the winners of the first Debating Science Issues (DSI) competition. DSI is a dynamic all Ireland debating competition, which invites young people to engage in debate on the cultural, societal and ethical implications of advances in biomedical science. Funded by the Wellcome Trust, DSI is co-ordinated by REMEDI, a research centre at NUI Galway with the Munster Regional section coordinated by the APC. Aisling Murphy, 5th year and Michael Coleman, transition year, represented BCS. The team was accompanied by teacher Ms. Kathleen Kelly and supporters.

Judges on the day included Professor Frank Gannon, Director General, Science Foundation Ireland; Brian Trench, Head of School of Communications, DCU; Dick Ahlstrom, Science Editor, The Irish Times; Siobhán O'Sullivan, The Irish Council for Bioethics; Tom Kennedy, Editor of Science Spin; Oonagh Meighan, Discover Science and Engineering and Cormac Sheridan, science journalist.



DSI Winners Aisling Murphy and Michael Coleman, Ballincollig Community School

Staff Awards



Evelyn Clayton has been awarded the APC Young Researcher of the Year Award.

Beth Brint received a 3 year Health Research Board Postdoctoral Fellowship award

John Cryan has received funding under the European Commission's Framework Programme 7 initiative for the project DEVANX to study the molecular basis of anxiety disorders and how perturbations in early life prime the brain for altered emotionality in adulthood.

Cormac Gahan received a Research Frontiers Programme 3 year Grant from Science Foundation Ireland for "Development of signature-tagged mutagenesis for functional genetic analysis of *Listeria monocytogenes* infection of the GI tract"

Paul Cotter has been awarded the 2008 SfAM (Society for Applied Microbiology) WH Pierce Prize in recognition of work on potential new therapies against multi-drug resistant pathogens. Paul and his APC collaborators, Colin Hill and Paul Ross, have designed new improved forms of an antibiotic-like compound, known as lantibiotics. with increased ability to kill *Listeria monocytogenes*, MRSA and *Streptococcus*.

Maire Begley received a European Society of Clinical Microbiology and Infectious Diseases (ESCMID) Research Grant and a Society for Applied Microbiology (SFAM) Students into Work Grant.

Marcus Claesson received grants to attend the 9th International Conference on Systems Biology in Gothenburg and the 9th Symposium on Lactic Acid Bacteria - Health, Evolution and Systems Biology LAB9 conference which will take place in the Netherlands in September.

Gerard Clarke received a travel award for the 'ECNP Workshop on Neuropsychopharmacology for Young Scientists in Europe, which took place in Nice in March.

Siobhain O'Mahony received a poster of distinction award at Digestive Disease Week San Diego 2008 for her poster "Gabapentin reverses colorectal distension-induced visceral pain behaviours in rat models of acute and chronic visceral hypersensitivity".

Fergus Shanahan gave the Schwabe-Walsh memorial lecture at UCLA in April and the Dan Perry Memorial Lecture at McMaster University in June.

Upcoming Events

APC Events

Science Week 2008
9-16 November 2008
Details: <http://apc.ucc.ie>

Discovery 2008
16-20 November 2008
Cork City Hall
Details: <http://www.corkcorp.ie/discovery/>

Irish Society for Colitis & Crohn's Disease Patient Open Day
Saturday 1 November 2008 @ 2pm
Cork University Hospital Main Lecture Theatre
Details: <http://apc.ucc.ie>

First International Symposium for Young Scientists and Technologists in Malting, Brewing and Distilling
6-7 November 2008, University College Cork
Contact: Ms Mary McCarthy-Buckley
Email: fitu@ucc.ie

RELAY Workshops
Optimum packaging solutions for extended shelf-life
10 September 2008, University College Cork
Contact Dr Amanda Forde
E mail: a.forde@ucc.ie

Exploiting the nutrients of fruits, vegetable and herbs
30 September 2008 University of Limerick
Contact: Derbhile Timon
Email: derbhile.timon@teagasc.ie

ISG Sligo Meeting



The 91st meeting of the Irish Society of Gastroenterology took place in Sligo in April and had many contributions from the APC. International keynote speakers included Prof. Charles Bernstein, University of Winnipeg, Manitoba, Prof. Jonathan M Rhodes, University of Liverpool and Prof. Ernie Seidman, McGill University. The Three "Irish" Scientists were Prof. Larry Egan, NUI Galway, Prof. Lokesh Joshi, NUI Galway and Prof. Paul Ross, APC. Prof. Eamonn Quigley, APC and President of the World Gastroenterology Organisation gave a presentation about 50 years of World Gastroenterology. APC's Mary Rea was awarded first prize for the best Oral presentation at the meeting, while Sinead Gibney and Alan Desmond received first and second prizes in the poster competition. The Winter Meeting of the ISG takes place on 13-14th November 2008 in Trim, Co. Meath. Further details www.isgorg.ie



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