

New treatment for hospital-acquired superbug *C. difficile*

APC researchers at UCC and Teagasc have identified a new antibiotic, thuricin CD, that is effective against the hospital-acquired superbug *Clostridium difficile*. *C. difficile* is the most rapidly increasing hospital-acquired illness in the Western world and is a major cause of death, particularly in the elderly. It is estimated that the annual cost of treating *C. difficile* associated diarrhoea (CDAD) amounts to €3 billion in the EU.



C. difficile infections arise as a direct result of disturbing gut bacteria following antibiotic treatment. Current antibiotics of choice for the treatment of CDAD are the broad spectrum antibiotics vancomycin or metronidazole, but treatment failures and recurrence of infection are common. The emergence of strains with increased resistance to these antibiotics has also been reported.

The potent new antibiotic peptide was discovered by screening over thirty thousand bacteria isolated from the human gut. Thuricin CD was identified, purified and characterised. It consists of two distinct peptides that act together to kill a wide range of clinical *C. difficile* strains. Thuricin compares very favourably with standard antibiotics in terms of controlling *C. difficile* in a model of the human colon. It has the significant advantage that it does not impact other bacteria in the gut, as disrupting the good bacteria can lead to outgrowth of *C. difficile*, which is in turn an important factor in the recurrence of the disease. This specificity of thuricin for *Clostridium difficile* is a key advantage it has over other antibiotic treatments.

The complete study, published as two papers in the Proceedings of the National Academy of Sciences of the USA (PNAS), involved the combined efforts of scientists and students from Ireland and the University of Alberta, Canada. PNAS is one of the world's most-cited and prestigious multidisciplinary scientific journals and its coverage spans the biological, physical, and social sciences. Thuricin CD is licensed by the APC to the Irish healthcare company Alimentary Health.



Alimentary Pharmabiotic Centre
Interfacing Food and Medicine

TB: A RE-EMERGING PROBLEM?

APC BRINGING SCIENCE TO SOCIETY

CHAIRPERSON

Dr Mary Horgan, Consultant Physician
in Infectious Diseases, Cork University Hospital

SPEAKERS

Tuberculosis: the resourceful opponent

Dr Dan Corcoran, Consultant Microbiologist,
Cork University Hospital

TB in Ireland

Prof Mike Prentice, Medical Microbiologist,
UCC & Principal Investigator, APC

Using microbes to PREVENT infection; an alternative to classic antibiotics?

Prof Colin Hill, UCC & Principal Investigator, APC

Brookfield Health Sciences Complex

Leacture Theatre G01

College Road, University College Cork

Tuesday, Nov 9th 2010, 7.30pm

Admission Free

Everyone Welcome

See <http://apc.ucc.ie> for more details

**IF YOU WOULD LIKE TO RECEIVE FUTURE COPIES OF
INSIDEOUT, OR HAVE ANY COMMENTS, PLEASE CONTACT**

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National Development Plan 2007 - 2013



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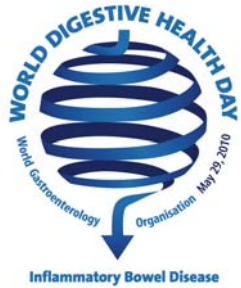
InsideOut

Welcome to this issue of Inside Out, a
newsletter for patients and professionals in the medical
community.

This issue is packed with interesting articles - learn how
researchers in the APC and Teagasc have discovered a
new treatment for the infectious superbug, *C. difficile*.
Eminent gastroenterologist, Prof David Rampton, spoke at
the most recent World Digestive Health Day forum, where
he advised Inflammatory Bowel Disease sufferers on how
to restore their quality of life. Read about the CORK
LONitudinal IBS STudy (COLONIST), which aims to define
valid biomarkers that could be
used to diagnose IBS and
possibly reveal new avenues for
therapy for this challenging
disease.



World Digestive Health Day - Living with Inflammatory Bowel Diseases



Inflammatory bowel disease (IBD) is a collective term for Crohn's disease and ulcerative colitis, serious chronic digestive diseases that affect five million people worldwide. IBD directly affects the digestive system, causing intestinal tissue to become inflamed, form sores, and bleed easily. There is no cure, no definitive known cause, and little public understanding of the pain and chronic suffering

which IBD patients courageously cope with every day. IBD commonly occurs early in life when people are still in education, or having a family, so the impact on quality of life is extremely important.

To coincide with World Digestive Health Day, UCC hosted a Public Forum, which aimed to provide an awareness of IBD and up-to-date information on living with this condition.

Professor David Rampton, Professor of Clinical Gastroenterology at Barts and the London School of Medicine explained that some factors can't be changed, such as the patient's age, gender and personality, but other causes of poor quality of life can be addressed, such as fatigue, anaemia, drug side effects and quality of medical treatment. Commonly associated with IBD are mood abnormalities such as depression, anxiety and stress problems, which can be addressed with medication, therapy or counselling, and can in turn greatly impact quality of life. How symptoms impact on life varies enormously from one patient to another depending on their work, family, education and other commitments. When treating patients, treatments that restore quality of life as much as possible should be considered and this requires a multidisciplinary approach to disease management.

The forum was chaired by Professor Eamonn Quigley, Professor of Medicine at UCC and Principal Investigator at the APC. Professor Quigley discussed how subtle forms of gut inflammation may affect the function of the gut and lead to symptoms such as pain, constipation and diarrhoea. Disorders such as IBS and diverticulosis may well fit into this category and could benefit, as a result, from new treatments.

COLONIST Study - The CORK LONGitudinal IBS Study

It is estimated that 15-20% of the adult population is affected by IBS, suggesting that there are 120 million patients in the developed world or approximately 54 million in the USA.

Scientists at the Alimentary Pharmabiotic Centre are looking to define valid biomarkers that could be used to diagnose IBS, which may also reveal new avenues for therapy in this challenging disease.

The gut microbiota is the collective name for the bacteria living in the gastrointestinal tract, of which the average adult has approximately 1-2kg. The composition of the human intestinal microbiota is variable between individuals, and is different in individuals with functional bowel disorders. The microbiota is linked with health indicators such as immune dysregulation and inflammation, which have been shown to respond positively to probiotic bacteria. The rationale for this research is to compare the microbiota in healthy subjects to those with IBS, and to identify changes in the microbiota which might either be causative or involved in the symptomology.

Professor Eamonn Quigley, Gastroenterologist, Professor of Medicine at UCC and Principal Investigator at the APC is leading this study, which will involve up to 500 healthy and IBS subjects and follow them at regular intervals over a 5 year time period. If you, or someone you know, suffers from IBS and would like more information about the COLONIST study, please contact Ann O'Neill at 087-9586255 or ann.oneill@ucc.ie.

Metchnikoff Award for APC Scientists

Four scientists who are Principal Investigators at the APC have been awarded the International Dairy Federation (IDF) Elie Metchnikoff Prize in Microbiology for 2010. The Prize which was presented at an Award Ceremony in Tromsø, Norway, is named in honour of the recipient of the 1908 Nobel Prize and it recognises outstanding contributions to the study of lactic acid bacteria.



Pictured are Colin Hill, Catherine Stanton, Gerald Fitzgerald and Paul Ross

Preventing colon cancer – is screening the right way forward?

Cancer of the colon and rectum affects about 6% of western populations and carries a mortality rate approaching 50%. Approximately 20% of colorectal cancer causation is due to genes and 80% due to environment, particularly diet. Individuals with a strong family history of colorectal cancer are therefore likely to benefit substantially from regular colonoscopic screening. The case for screening the "normal risk" population is less straightforward.

Screening of stool samples for non-visible ("occult") blood reduces mortality from colorectal cancer by about 15% and is cost-effective. Such screening is currently offered for all adults over 60 in England and Wales. It undoubtedly saves some lives but it is likely that most people greatly overestimate its likely impact on life expectancy. The average increase in life expectancy achieved by occult blood screening over age 60 has been estimated at 3.8 days. It improves to about 10 days if screening is done over age 50. Screening by direct endoscopic visualisation of the distal colon is substantially better but is still likely only to improve life expectancy on average by a few weeks (but with large variations around this) and complete abolition of all deaths from colorectal cancer would only increase average lifespan by about 4 months.

An alternative approach is to get a better understanding of the dietary factors that affect risk for colorectal cancer. These include the potential for soluble plant fibres found in leafy green vegetables (e.g. broccoli) and soft fruit (e.g. bananas) to block potentially harmful interactions between intestinal bacteria and the lining of the colon. There is also a large body of data suggesting that a high calorie intake and infrequent physical exercise are powerful risk factors for colorectal cancer.

Screening normal risk individuals for a relatively common cancer seems like a good idea but alterations in life style might have much great impact on health and longevity, if individuals could be persuaded to stick to them.

