DMMC News
March 2007
The DMMC was established through PRTLI, funded by the Higher Education Authority

ACSTI Report: Recommendations on Health Research in Ireland

Timothy O'Brien
Director of REMEDI & Head of Medicine,
National University of Ireland, Galway

Some will have been struck by the number of reports on Clinical Research that have been emanating from various quarters; Governmental bodies, Patient Groups, Funding Agencies, etc. Even more remarkable is the degree of alignment around key objectives and prerequisites for Ireland to become competent and competitive in this domain.

The Advisory Council for Science, Technology and Innovation (ACSTI) advises the Government and serves as the primary interface between stakeholders and policymakers in the Science, Technology and Innovation arena. The council recently undertook a review of health research at a time of major investment in basic research by Government and the changing structure of the health service. The council identified a number of issues that need to be resolved to maximise the return on health related research, which I will summarise here.

National Health Research Policy and Strategy: There is a need for national leadership in health research in the Department of Health at the level of Assistant Secretary. It was recommended that a health research subgroup of the Interdepartmental Committee, comprising members of all Government Departments with a role in health research, should be established. A health research forum of stakeholders should be convened on a regular basis.

Integrated Governance: The council recommended integrated Governance between teaching hospitals and associated Universities.

Funding: The council recommended an increase in funding for health research which should be distributed on the basis of excellence and peer review. The budget for the Health Research Board (HRB) should be increased to allow for development of clinical research infrastructure, training schemes, and to commission research on behalf of other bodies such as the Health Service Executive.

Human Capital, Infrastructure and Equipment The human capital element is of particular relevance to the DMMC as it places a major emphasis on health research training. Other major issues to be addressed include the provision of protected time for clinicians (timely given the consultant contract negotiations) and the establishment of postgraduate training schemes for clinician investigators. A national network of Clinical Research Facilities is recommended.

Innovation, Regulatory Affairs and Translation: Ireland should be developed as a single translational

DMMC News

DMMC News is a forum for the molecular medicine research community in Dublin to present the latest developments of interest to a local and international audience.

DMMC News is circulated widely in Dublin and to contacts further afield; it is also available to all from the DMMC website (www.dmmc.ie/DMMC_News.htm). It is an opportunity to present research news, in the context of the developing cross-institutional collaborative environment, to fellow scientists and clinicians, funding agencies, government bodies, and the public. *DMMC News* also contains listings of events (seminars, meetings, courses and workshops). Contact newsletter@dmmc.ie to contribute to future issues.

On other pages

hub with an innovative service generating intellectual property. In addition, four regional ethics committees for approval of clinical trials are recommended.

The council's recommendations arose from a substantial process of consultation and the input of international experts. If the recommendations are implemented, a step change in the quality and quantity of health research undertaken in Ireland will result with substantial benefits for health care delivery and the creation of a knowledge economy. I look forward in the future to substantial collaboration between health researchers in Ireland through DMMC and the Irish Clinical Research Infrastructure Network (ICRIN) to realise this vision. The full report can be found at http://www.sciencecouncil.ie/

Moving On

Pierre Meulien
Chief Executive, DMMC

As you all know by now, during the first half of 2007, I will be leaving the DMMC and Ireland.

In order to better balance my personal and professional life, I have decided to return to Canada and will be taking up an appointment as Chief Scientific Officer with Genome BC in Vancouver in late spring. Genome BC is a multi-disciplinary, multi-institutional and multi-thematic group whose activities cover Human Health, Agriculture, Forestry, Marine and Environmental sectors. Established in 2000, Genome BC is in the process of implementation of a CAD $300 million programme and also building a strategic plan to cover the period 2010-2015. This independent entity is directly financed by both the provincial and federal governments.

I have greatly enjoyed my time with the DMMC and consider myself lucky to have been involved from the beginning in this unique venture. I am convinced that it can develop further into the more national initiative that has already been agreed to at DMMC Board level. Through the vision of its founders, and the courage of the HEA and the Atlantic Philanthropies in funding such an innovative project, the molecular medicine community in Dublin has gone through a dramatic change in its landscape. Of course the road has not always been smooth, but the results are now there for all to see. It is generally acknowledged that no single institution could have competed successfully with Oxford, UCL and Imperial College in the Wellcome Trust / HRB competition for Clinical Research Centres funding. The development of the €20 million Dublin Centre for Clinical Research will be transformational and is witness to the power of the collective approach. This is the demonstration of value addition.

Already, the current owners of the DMMC have committed to underpinning a replacement position for the CEO for the next 5 years and an active recruitment drive is ongoing. The 5 medical schools in Ireland have come together to create ICRIN (Irish Clinical Research Infrastructure Network; see page 5) and will be submitting a proposal to the next round of PRTLI to create Molecular Medicine Ireland using the DMMC model and existing infrastructure. This can only lead to a more positive environment in which to provide cutting edge treatments to Irish patients putting research at the heart of modern healthcare.

I would like to thank the Principals of the Colleges, the DMMC Board superbly Chaired successively by Kieran McGowan, Pat Gage and Michael Kamarck and the Executive Management Team, Professors Dermot Kelleher, Brian Harvey and Bill Powderly for their constant support and friendship over these past years. Finally, I have had a great deal of luck in having a Directorate team that has shown great loyalty over the years. It is indeed difficult to leave these talented people with whom I have shared so much fun (and hard work!!).

I wish you all the very best,
Pierre

DMMC Courses & Workshops: A Flexible Postgraduate Education Resource

Mark Watson
Education & Information Coordinator, DMMC

We are now well into the fourth year of DMMC Education & Training, and the format of short courses made available across institutions continues to prove a winner. DMMC Courses and Workshops directly address the translational medicine research space and as a result they bring together a rich variety of basic and clinical research scientists and technical staff. These individuals participate both as faculty and as attendees wanting to develop their

knowledge in their own research disciplines and expand their knowledge in related research areas. DMMC Courses & Workshops are for all those with an active interest in biomedical research, whether postgraduate students, postdoctoral workers, technical staff, or senior academics and clinicians.

This article is not a preview of forthcoming DMMC Courses & Workshops or a highlight of past successes. You can access that information elsewhere in DMMC News and on the DMMC website. Here I want to talk about how we can make DMMC Education & Training a better resource. How we can use this very flexible format more widely and how we can ensure that it continues to develop in content and scope in line with what the biomedical sciences research training community needs.

Using existing and developing new DMMC Courses & Workshops is an attractive proposition for those involved in capturing funds for new thematic postgraduate training initiatives and for those involved in building the taught course element of new institutional Graduate Schools and postdoctoral training programmes. The ethos of DMMC activities, collaboration where it makes sense in order to advance and apply knowledge and make the best use of resources, complements well the agendas of the research funding bodies, as articulated in recent funding calls.

During the past four years the DMMC Directorate has gained much experience and amassed considerable expertise in the development and delivery of short taught courses and advanced workshops. We have built excellent guidance and administrative structures designed to help busy scientists and clinicians develop and contribute to courses that transcend institutions to make the best use of resources and reach more colleagues. We have many contacts among scientists in academia and industry, both in Ireland and overseas, together with other groups who facilitate what we do, such as commercial sponsors. We represent a professional interface that can provide advice and practical assistance to shape an educational event, together with a well developed infrastructure for advertising, participant registration, administering attendance and participant feedback. We have a very strong user base for our educational activities (see boxout below), and this is set to expand further with the partnership of Cork and Galway in forthcoming DMMC activities and the future development of Molecular Medicine Ireland. This expansion will be accompanied by the adoption of E-learning technologies to help us reach a wider audience.

All this experience can be brought to bear to enhance your postgraduate, postdoctoral and staff training activities. Anyone with a role in developing biomedical research training with a structured taught course component should talk to me at an early stage. We can discuss how the DMMC can help you and how you can help the DMMC and the cross-institutional research training community we've helped to build. Even education and training enterprises that are by their very nature (e.g. due to research theme, size, or strategic imperative) based in a single institution should consider the DMMC as a partner. By incorporating a DMMC Course into your postgraduate training programme you can expose your students to a broad educational platform and the diverse biomedical research community that uses it. By contributing towards a new DMMC Course in your research specialty, you can reach out to that community. Talk to me so that we can capitalise on the flexibility of the DMMC Courses & Workshops model and use it to complementary advantage.

Between December 2003 and December 2006, 1045 individuals each attended one or more DMMC Courses & Workshops (repeat users are commonplace). Of these, 46% were from University College Dublin and affiliated hospitals, 27% were from Trinity College Dublin and affiliated hospitals, 15% were from the Royal College of Surgeons in Ireland and affiliated hospitals, and 12% were from elsewhere in Ireland and overseas. The total included 499 PhD students and 156 postdoctoral staff. During the same period, 139 individuals (Principal Investigators and postdoctoral staff) were faculty: 55 from UCD, 28 from TCD, 26 from RCSI, and 30 from elsewhere in Ireland and overseas. Many of these individuals were instructors on a number of DMMC Courses in this period.

TECHNOLOGY UPDATE: Digital Slide Scanning & Tissue Micro-arrays at the UCD Conway Institute

Sarah Penny, Elton Rexhepaj & William M. Gallagher, UCD

Tissue microarrays are becoming an increasingly important tool for high-throughput investigation of biomarkers at DNA, mRNA and protein levels. This technique allows for the analysis of up to 500 tissue samples in a single experiment via immunohistochemical analysis or, less commonly, *in situ* hybridisation. Tissue microarrays play a central role in translational research, facilitating the discovery and validation of factors that have potential roles in the diagnosis, prognosis and prediction of response to therapy. For several years, our research group has been involved in the application of transcriptomic and proteomic profiling approaches to identify putative cancer biomarkers and functional mediators of disease progression. Tissue microarray technology has provided us and others with an ideal mechanism for translation of such work into clinical relevance. Early on, we identified a clear need for adoption of advanced image analysis approaches to match the high-throughput nature of the experimental modality provided by tissue microarrays. In this context, the UCD Conway Institute established a state-of-the-art Histology Core Facility, with a particular focus on tissue microarray construction and image analysis, benefiting from generous support by the Health Research Board and other funding agencies.

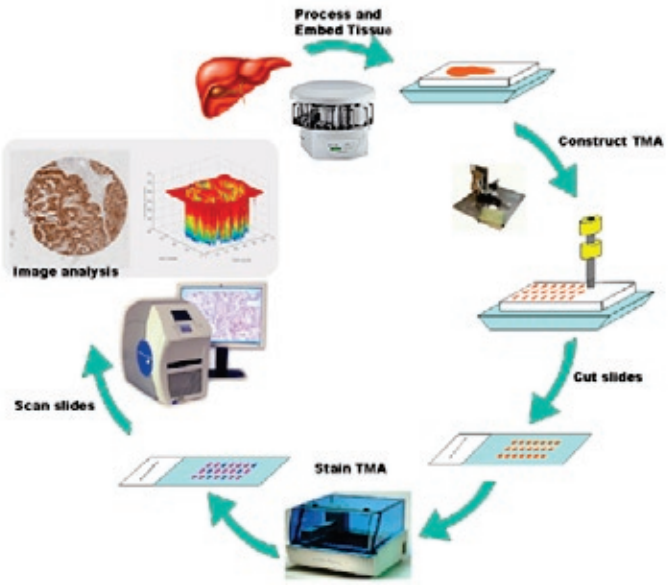


Fig 1. Workflow from tissue microarray construction to image analysis of digital slides.

The Histology Core Facility contains all the modern technology needed to get from tissue samples to a digital slide library suitable for statistical analysis of protein biomarkers. Technologies available include automated tissue processing, paraffin embedding, an antigen retrieval module, autostainers for routine stains or fully programmable for novel techniques and an automatic coverslipper. In addition, we have the Republic of Ireland's only Aperio automated slide scanner based in academia; this user-friendly system (ScanScope CS) produces crisp entire-slide scans at 20X or 40X, allows use of computational image analysis approaches and offers remote viewing to anyone with internet access. All of these facilities may be used for a small fee (for cost recovery) and full training is available. Notably, we are in the process of implementing an inter-institutional network for Digital Slide Management and Image Analysis via recent funding under the HRB Informatics Infrastructure programme, which currently involves UCD, RCSI and DCU, but will form a platform for a much wider national network.

The appropriate and efficient use of clinical resources is becoming a rate-limiting issue in maximising the tremendous potential offered by omic-based screening approaches. There is a key requirement to train researchers in tissue microarray technology to offset this potential bottleneck in target validation. We are addressing this issue by running an EMBO Practical Course '*Tissue Microarrays and Image Analysis*' from 11-15 June 2007 (see http://cwp.embo.org/pc07-15/ for details). Tissue microarray and digital slide technologies, which will be focused on in this practical course, have a wider applicability outside the clinical arena, such as in the monitoring of toxicological responses in animal models and screening of immunohistochemically stained mouse embryos (e.g. the Atlas of Protein Expression project at the Wellcome Trust Sanger Institute). The primary objective of the practical course is to provide hands-on experience in the experimental workflow from construction of tissue microarrays to associated image analysis. This objective will be met through a combination of seminars from local and international experts in the field, including several 'question and answer'/discussion periods, together with practical experience in the laboratory and on the computer. The course is aimed towards biomedical scientists and clinical researchers, who will observe and participate in the construction and use of tissue microarrays, with training being provided in all relevant steps from tissue processing, array fabrication, sectioning and immunohistochemical staining.

Please contact sarah.penny@ucd.ie for more information on digital slide scanning, and george.keating@ucd.ie in relation to the Histology Core Facility at the UCD Conway Institute.

Irish Clinical Research Infrastructure Network Launch

Caroline Ang, DMMC Programmes Manager

The Irish Clinical Research Infrastructure Network (ICRIN) was officially launched on the 25 January 2007 at the Burlington Hotel, Dublin. Over 30 key stakeholders, funders, and supporters attended, including representatives from the Irish medical schools, the major teaching hospitals, the academic Clinical Research Centres, the Irish Medicines Board, the Health Research Board (HRB), and the Health Service Executive (HSE).

The afternoon meeting began with an introductory presentation on ICRIN by Dr Pierre Meulien, CEO of the DMMC, followed by talks from Prof Muiris Fitzgerald representing the HSE, and Dr Anne Cody from the HRB. We were extremely fortunate that Dr Jacques Demotes, the *European Clinical Research Infrastructures Network* Programme Coordinator, was able to attend and talk more about ECRIN and its important role in integrating national clinical research facilities into an EU-wide network to support clinical research in Europe. The presentations were followed by a lively discussion amongst the attendees on topics covering: the role of ECRIN in FP7 programmes; the need for support for Academic Investigator-led clinical studies; the links between European and national working groups. The meeting concluded with a wine reception which was enjoyed by all!

The creation of ICRIN is part of an ambitious project which will attempt to fill all remaining gaps (human capital, physical infrastructure and information systems) needed to create a world class clinical research capacity in Ireland. ICRIN has been created under a Memorandum of Understanding between University College Dublin (UCD), The University of Dublin, Trinity College, Dublin (TCD), Royal College of Surgeons in Ireland (RCSI), University College Cork (UCC), The National University of Ireland, Galway (NUIG) and Dublin Molecular Medicine Centre (DMMC). ICRIN will be Ireland's representative within ECRIN.

ICRIN's main objectives are:

- To engage with the constituent teaching hospitals to develop a national clinical research infrastructure in Ireland that facilitates cutting edge clinical research in a safe and regulated environment. Patients will benefit from the best interventions carried out under the best international standards of Ethics and GCP.
- To provide a framework for the harmonisation and regulation of different operating norms into a common, European-linked system (Ireland joined the European Clinical Research Infrastructure Network in October 2006).
- To ensure that education and training programmes are put in place for clinical research staff (e.g. research nurses, data managers) that allow standards to be maintained and continuously updated.
- To allow Irish academic and non-academic clinical investigators to participate in multi-centred clinical studies.
- To drive a standardised approach to biobanking at all sites.
- To drive harmonisation of procedures in Ireland with respect to Informed Consent, Ethical Review, Data Monitoring, Adverse Event Reporting, etc. in line with ongoing work in Europe.

ECRIN currently includes 12 trans-disease networks of Clinical Research Centres (CRC) and Clinical Trial Units (CTU). These networks cover 9 EU countries representing 350 million citizens. No equivalent infrastructure exists in Europe. In addition, the Canadian participant (UBC-GEREC) extends the capacity of ECRIN to perform clinical studies on the North American continent, using data management tools compatible with FDA requirements.

RESEARCH UPDATE. APOCOLON: Enhancing Sensitivity of Colon Cancer Cells to Apoptosis

Caoimhin Concannon, Markus Rehm & Jochen Prehn, RCSI

Colorectal Carcinoma (CRC) is the most common major cancer in the Irish population, with approximately 2000 new cases and 1000 deaths annually. 5-Fluorouracil-based chemotherapy

regimens are the standard treatment for colorectal cancer in both the adjuvant and advanced disease settings. Central to the mechanism of action of these drugs is the activation of a cell death process termed apoptosis. However, impairment of apoptosis and the inability to efficiently activate this process is currently a barrier to treatment, leading to drug resistance and treatment failure. Caspases are the key proteases activated during apoptosis, triggered by the release of cytochrome-*c* from the mitochondria into the cytosol. Release of cytochrome-c from mitochondria is controlled by the Bcl-2 family which comprises both pro- and anti-apoptotic factors and whose expression levels are frequently modulated in cancer cells. For apoptosis to proceed, the activity of the anti-apoptotic Bcl-2 family members needs to be neutralised. This occurs through the stress-induced, transcriptional and post-translational activation of a subset of pro-apoptotic Bcl-2 family members, the BH3-only proteins.

In our laboratory we utilise classical biochemical techniques in combination with real time single cell microscopy to investigate the key events in determining cellular response to chemotherapeutics. Ultimately the ability to induce apoptosis within cancer cells is determined by the ability to tip the balance of expression in favour of the pro-apoptotic factors, either by increasing their expression or by neutralising the functioning of the anti-apoptotic factors. One such strategy currently being investigated within our lab is the utilisation of drugs which inhibit the proteasome, a recent novel target for chemotherapeutics. Many intracellular pathways and molecules, including several involved in the control of apoptosis, are regulated via proteasome mediated degradation. We have recently demonstrated that proteasome inhibitors induce the expression of the BH3-only protein, PUMA. In colon cancer cells this induction of PUMA is mediated in a p53 dependent manner, with the loss of PUMA expression significantly attenuating the levels of apoptosis induced (Concannon et al., 2006). In another approach we are investigating whether alterations in the expression levels of XIAP, a caspase inhibitor, can increase resistance of cells to chemotherapeutics. Using real time single cell microscopy we can visualise how increasing levels of XIAP affect caspase activation and cell survival.

In collaboration with Prof Elaine Kay in the Department of Pathology, Beaumont Hospital we are utilising tissue arrays from colorectal cancer (CRC) patients to investigate the expression levels of the major components involved in regulating apoptotic pathways, in comparison to non-diseased controls. Clinico-pathological data including tumour grade, stage, vascular invasion status along with disease specific survival data has been collected prospectively. This study may potentially identify predictive prognostic markers and help predict responses to new anti-cancer treatment paradigms.

In order to further understand how variations in the expression levels of proteins involved in the apoptotic cascade can effect cellular response to chemotherapeutic agents we have recently developed a systems biology model encompassing all key components and reactions involved in the activation of caspases via the mitochondrial pathway of apoptosis (Rehm et al., 2006). This model allows the user to theoretically alter the expression levels of their protein(s) of interest and investigate whether this alteration in protein expression will result in caspase activation or in cell survival (Huber et al., 2007). Currently we are performing a quantitative analysis of the components of the mitochondrial apoptosis pathway in biopsy samples from CRC patients. The results obtained from these samples allows us to implement the data into our model and analyse whether model predictions correlate with tumour responsiveness to chemotherapy.

Concannon CG, Koehler BF, Reimertz C, Murphy BM, Bonner C, Thurow N, Ward MW, Villunger A, Strasser A, Kogel D and Prehn JH. (2006). Apoptosis induced by proteasome inhibition in cancer cells: predominant role of the p53/PUMA pathway. *Oncogene*. Sep 18; [Epub ahead of print].

Huber HJ, Rehm M, Plchut M, Dussmann H and Prehn JH. (2007). APOPTO-CELL - A simulation tool and interactive database for analyzing cellular susceptibility to apoptosis. *Bioinformatics*. Jan 19; [Epub ahead of print].

Rehm M, Huber HJ, Dussmann H and Prehn JH. (2006). Systems analysis of effector caspase activation and its control by X-linked inhibitor of apoptosis protein. *EMBO J.* **25,** 4338-4349.

The Innovative Medicines Initiative

Pierre Meulien
Chief Executive, DMMC

The Innovative Medicines Initiative (IMI) is a new Joint Technology Initiative funded by the European Commission and the European Federation of

Pharmaceutical Industries Associations (EFPIA). IMI is an innovative approach to ensuring that Europe remains competitive in its ability to develop new ways of bringing cutting-edge therapeutics to patients. This industry-driven initiative is EFPIA's top priority and gives Europe an unprecedented opportunity to reverse the growing trend of Pharma R&D investment going to the US and Asia.

The total budget allocated to IMI is €2 billion (half from industry and half from the Commission). A strategic research agenda has been developed after wide consultation and is now finalised (see http://www.imi-europe.org).

The main goals of IMI are to remove some of the roadblocks which are currently hampering efficient and successful drug development. In order to do this, unprecedented partnership between industry, academia and clinical centres is necessary. These roadblocks include:

- Predicting the suitablility, safety and efficacy of new drugs.
- Need to integrate education & training and knowledge management with the scientific programme.

At a recent meeting of the member states contact group (on which Pierre Meulien sits), Dr Jonathan Knowles (Director of EFPIA R&D group and Global Head of Research for Roche) gave a talk from the industry perspective. The main points were:

- IMI type initiatives are springing up in the USA, Japan, Malaysia and other countries. Europe needs to catch up with these if we are to play in the same league. If we do not progress this type of initiative in Europe, Pharma R&D dollars will continue to move elsewhere.
- We need to proactively generate member state support at the highest level in order to get the green light from the EU Council in March (Irish ministers for Enterprise, Health, Education).

The first call has been discussed and will most likely be around:

- Biomarkers for drug safety
- Pharmacovigilence
- Brain diseases
- Diabetes
- Education and Training components

This call is likely to be made in December 2007. There is thus an urgency for Irish groups to get involved in existing networks around the chosen areas in order to be prepared.

IMI will use EU infrastructures like ECRIN to ensure maximum effectiveness in delivering its goals. Pierre Meulien will be replaced by Dr Paul Roben -Enterprise Ireland- as Member State Group representative for Ireland.

News In Brief...

New DMMC Board Member

Dr Damian O'Connell joined the DMMC Board of Directors on 6 February 2007. Dr O'Connell is an executive director of Pfizer and is global clinical leader for the company's analgesic portfolio. Accomplished in senior leadership roles and strategic pharmaceutical development and knowledge, Dr O'Connell was previously head of experimental medicine at the Pfizer Global Research and Development laboratory in Kent, UK. Before that, he worked as international drug director for Warner-Lambert.

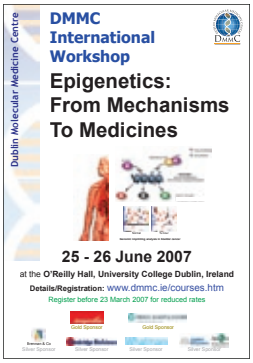
Dr O'Connell, who has both MD and PhD degrees from the National University of Ireland, has been a medical faculty member of the University of Virginia Health Sciences Centre, as well as being a member of the Clinical Pharmacology and Therapeutics Department at University College Cork. He serves as a member of the experimental medicine and safety biomarker committees of the Association of the British Pharmaceutical Industry and was a rapporteur for the efficacy component of the recently published 'Innovative Medicines Initiative'.

In addition, Dr O'Connell is a Fellow of the Royal Academy of Medicine in Ireland; he is a member of the British Pharmacological Society, the American Society for Clinical Pharmacology and Therapeutics, the American College of Clinical Pharmacology and the Irish Association of Pharmacologists.

Forthcoming DMMC Courses

DMMC Courses covering Microarray Experimental Design and Data Analysis, Drug Design, and Population Genetics & SNP Analysis are in the pipeline. Visit http://www.dmmc.ie/courses.htm

DMMC International Workshop



25-26 June 2007 are dates for your diary. The first DMMC International Workshop takes place in the O'Reilly Hall, University College Dublin. Dr Amanda McCann (UCD) and Dr Steven Gray (TCD) have teamed up with the DMMC Directorate to organise *Epigenetics: From Mechanisms To Medicines*, a two-day workshop for researchers and clinicians based in Ireland and overseas.

Many of you will have noted the increasing evidence of epigenetic mechanisms playing major roles in numerous developmental and disease phenotypes. Now is your chance to hear about the latest research worldwide and its translation to clinical application.

The Workshop faculty includes Prof Peter Jones (USC / Norris Comprehensive Cancer Center, USA), Prof Stuart Schreiber (Broad Institute, Harvard and MIT, USA), Prof Wolf Reik (The Babraham Institute, Cambridge, UK), Dr Joyce Ellen Ohm (Johns Hopkins University, USA), Prof Eamon Maher (University of Birmingham, UK), Prof Michael Skinner (Washington State University, USA), and many more.

Lectures cover epigenetic mechanisms (including involvement of regulatory RNAs and environment interactions), implications in Assisted Reproduction Technology and stem cells, and current epigenetically targeted therapeutics in the treatment of solid tumours, haematological disorders, and neurodegenerative conditions. Techniques workshops and poster sessions are interspersed.

The registration fee, which includes the workshop dinner, is very competitive - with reduced rates prior to 23 March (only €150 for students). Poster abstracts are invited. Go to http://www.dmmc.ie/courses.htm for more details and to register online. Thank you to our sponsors - Gold sponsors: Diagenode; Merck Sharp & Dohme. Silver Sponsors: Brennan & Co; Cambridge BioScience; Whatman; Applied Biosystems & Ambion.

This workshop is a unique opportunity to hear and meet international experts in translational research. Don't miss it - register now.

Events

See www.dmmc.ie for more information on these and other events
Please send details of forthcoming events to newsletter@dmmc.ie

DATE (2007)	EVENT	LOCATION
13 - 22 Mar	**NIBRT Course: Principles of Bioprocessing**	Radisson Hotel, Little Island, Cork
22 Mar	**Conference: World TB Day 2007** Contact ahfeeney@mater.ie	Royal College of Physicians of Ireland, Kildare Street, Dublin 2
17 Apr	**DMMC Course: Microarray Experimental Design**	Trinity Centre for Health Sciences[1]
19 - 24 Apr	**DMMC Course: Drug Design - Principles & Techniques**	RCSI, St Stephen's Green, Dublin 2
3 May - 4 May	**Conference: Cancer 2007** Contact mlawler@stjames.ie or fhoolahan@stjames.ie	Shelbourne Hotel, St Stephen's Green, Dublin 2
10 May	**DMMC Course: Microarray Data Analysis**	Health Sciences Centre, UCD
18 May	**Conference: ISGCT Inaugural Scientific Meeting** Contact conference@isgct.ie	REMEDI, National University of Ireland, Galway
11 - 15 Jun	**EMBO Practical Course: Tissue Microarrays and Image Analysis**	UCD Conway Institute[2]
25 - 26 Jun	**DMMC International Workshop: Epigenetics - From Mechanisms to Medicines**	O'Reilly Hall, UCD
27 - 29 Sep	**Conference: 7th World Basic Urological Research Congress**	University College Dublin

[1] *Institute of Molecular Medicine (IMM), St James's Hospital, Dublin 8*
[2] *UCD Conway Institute of Biomolecular & Biomedical Research, UCD, Belfield, Dublin 4*