A warm welcome to the third newsletter of TBSI, which will give you a taste of what we are up to. We have news of ongoing exciting discoveries, publications, collaborations, prizes, high profile visits and conferences.

Some highlights of this newsletter:

**Discoveries:** Two more high profile publications in Nature.

**Visitors:** A visit to TBSI from James Watson of the DNA double helix.

**27 Ambassadors from Brussels on April 11th.**

**Commercialisation:** Opsona raises €33m to fund a Phase II trial in kidney transplant.

**Annual Symposium:** Metabolism and Metabolic Diseases – held April 15th.

**NMR Launch:** One of the best equipped facilities in Europe, launched on April 16th.

**Wellcome Trust:** €1.8m from the Wellcome Trust for exhibitions with the Science Gallery, TCD.

Luke O’Neill
Academic Director

**DISCOVERIES** (To read more go to recent discoveries or to www.tcd.ie/biosciences)

Researchers reveal that the Immune System is like a Turbo-Charged Hybrid Car

Led by Professor of Biochemistry, Luke O’Neill, researchers in TBSI have made a breakthrough in the understanding of the inflammatory process. A “metabolic shift” occurs, leading to innate immune activation and inflammation involving the metabolite succinate. The work is a major collaboration between 10 Centres including the universities of Harvard, MIT, Massachusetts General Hospital, Cornell, California, Sheffield and Duquesne and also involved scientists in the Beatson Institute of Cancer Research in Glasgow and University College Dublin. Funding was largely by the European Research Council and Science Foundation Ireland. The findings were published in

http://www.nature.com/nature/journal/v496/n7444/full/nature11986.html Nature paper
Vitamin A: Scientists uncover Protective Influence of Vitamin A against Inflammatory Bowel Disease

Novel discoveries around the protective influence of Vitamin A against the damaging immune responses that lead to inflammatory bowel disease. The research led by Professor of Experimental Immunology, Kingston Mills has just been published in the leading Medical journal *The Journal of Experimental Medicine.*

Inflammatory bowel diseases (IBD) include Crohn’s disease and ulcerative colitis and affect over 2 million people in Europe and more than 15,000 in Ireland. The diseases are characterised by inflammation and damage to the intestine caused by a combination of genetic and environmental factors. The damaging inflammation is mediated by immune cells that infiltrate the gut tissue and are activated locally by bacteria normally resident in our gastrointestinal tracts.

Read Irish Times online

New Crystal Structure Helps Explain 50 Years of Research on a Novel Membrane Enzyme in *E. coli*

Diacylglycerol kinase, the smallest known kinase, is an enzyme involved in the synthesis of key components of the cellular envelope, including lipopolysaccharide, in Gram-negative bacteria. Dr Dianfan Li of Professor Martin Caffrey’s group, has led the research to determine the crystal structure of diacylglycerol kinase from *E. Coli* at high resolution using state-of-the-art X-ray crystallographic techniques and X-ray synchrotron sources, leading to a greater understanding of how this enzyme functions at a molecular level. The findings are likely to attract considerable attention, in part because they help explain almost half a century of work on this paradigmatic membrane protein, but also because the crystal structure differs profoundly from the only other structure available for this novel kinase that was obtained using solution nuclear magnetic resonance.

Hyperlink to web and also embedded is NATURE paper:  
Whooping Cough:
Children are routinely vaccinated against whooping cough, a potentially fatal infection caused by the *Bordetella pertussis* bacteria. Unfortunately, the currently used vaccine while very safe, does not give strong, long-lasting immunity, says Kingston Mills, professor of experimental immunology of TBSI. In many countries including Ireland, the US, Australia and the Netherlands, there is an increased incidence of whooping cough, possibly as a result of the fall-off in immunity over time. Kingston Mills has been working on improving the vaccine, with funding from Science Foundation Ireland. A different adjuvant based on bacterial DNA is used, which has brought an immediate improvement in laboratory tests and which may lead to an improved vaccine. The work is published in the leading international journal PloS Pathogens. Read Publication online and Irish Times article

INTER-SCHOOL PUBLICATIONS

It is widely recognised that interdisciplinary collaboration results in high quality research. A key goal of TBSI is to encourage collaborations between schools and it is good to see how much collaboration is taking place. A measure of the extent of this is the number of inter-school publications. Examples of recent joint work are given below.

**MyD88 Adaptor-like (MAL) functions in the Epithelial Barrier and Contributes to Intestinal Integrity via Protein Kinase C**

A recent collaboration between lead investigator Dr Sinéad Corr and Prof. Luke O’Neill from the School of Biochemistry and Immunology and Prof. Padraic Fallon from the School of Medicine, identified a novel regulatory role for the TLR adaptor MAL in the maintenance of the intestinal epithelium in response to a bacterial threat (Corr et al. Nature Mucosal Immunology Apr. 24 2013). The work identifies the protein Mal as being key to maintaining the gut barrier from injury and infection, and could have relevance to diseases such as ulcerative colitis.
Antagonists for Androgens


Other Joint Publications Include:

Hepatitis C virus targets the interferon-α JAK/STAT pathway by promoting proteasomal degradation in immune cells and hepatocytes.
Schools of Biochemistry and Immunology and Medicine

Combretazet-3 a novel synthetic cis-stable combretastatin A-4-azetidinone hybrid with enhanced stability and therapeutic efficacy in colon cancer.
Schools of Pharmacy and Biochemistry and Immunology

Synthesis and biological evaluation of Foscan® bile acid conjugates to target esophageal cancer cells.
Schools of Chemistry and Pharmacy and Pharmaceutical Sciences

Aromatic bis-N-hydroxyguanidinium derivatives: synthesis, biophysical, and biochemical evaluations.
Schools of Chemistry and Biochemistry and Immunology
MAJOR EVENTS

DOUBLE HELIX: Dr. Jim Watson’s visit

On April 30th, TBSI had the honour of hosting a visit from Dr James Watson, just 60 years since the ground-breaking paper on the structure of DNA was published in Nature on April 25th, 1953. Part of his visit to TBSI involved an informal meeting with over 50 key Trinity cancer researchers where he outlined some interesting ideas he has published on reactive oxygen and cancer. After he outlined his ideas there was a question and answer session and discussion of the ideas. He also met with the postdocs in TBSI and gave them words of wisdom as to how to make a career from science.

Figure 11 Dr. Jim Watson in conversation with post docs in the Knowledge Exchange on 30th April

Special Seminar with Prof Sir Stephen O’Rahilly

On 15th February, TBSI had a special seminar with recently knighted Prof Sir Stephen O’Rahilly, Professor of Clinical Biochemistry and Medicine, and Director of the Metabolic Research Laboratories in the Institute of Metabolic Science at the University of Cambridge. Prof O’Rahilly gave an impressive talk in the Tercentenary Hall on “Human Metabolic Disease: Lessons from Genetics”.

Figure 12 Prof Sir Stephen O’Rahilly

COREPER 1 Visit 11 April 2013

COREPER is made up of Ambassadors from EU Member States, based in Brussels, who are responsible for preparing Ministerial-level Council meetings. There are two Committees, COREPER I and COREPER II. COREPER I comprises the deputies of the ambassadors to the EU based in Brussels. Ambassador Tom Hanney represents Ireland and chaired COREPER I for the first six months of 2013.

TBSI welcomed COREPER I on a visit on 11th April. Luke O’Neill gave feedback on experiences with the ERC grant system and there was a discussion regarding Horizon 2020. The Committee also paid a visit to the Department of Anatomy, hosted by Paul Tierney.

Figure 13 COREPER I with Luke O’Neill
The TBSI Annual Symposium 2013 entitled ‘Metabolism and Metabolic diseases’ took place on Monday, April 15th. The Provost (Patrick Prendergast) launched the meeting by welcoming everybody and by giving them an introduction to workings and goals of the Institute. The theme of the Symposium was “Metabolism and Metabolic Diseases”. The presentations were
- an inspirational lecture by Gregory Petsko (Brandeis University, Massachusetts, USA) on synuclein and its role in Parkinson’s disease.
- a substantive performance from Grahame Hardie (University of Dundee, Scotland, UK) on the targeting cancer cell growth via the major metabolic sensor, AMP kinase.
- Luke O’Neill (TBSI) gave an ebullient lecture on the metabolic switches that drive inflammation in innate immunity.
- Paul Browne (TBSI) gave an insightful discourse on haematological cancers and informed us about current and novel strategies to treat them.
- Isabel Rozas (TBSI) spoke on her group’s state-of-the-art work designing and testing anti-depressants.
- Anne Molloy (TBSI) gave a moving tribute to the work of the late John Scott (TBSI) with whom she worked for many years. The lecture covered the genesis of his interest in the field of folate and vitamin B12 metabolism, and the significant discoveries he made to it. Recognition was also given to the long-standing and highly productive collaboration between Scott and Donald Weir (Emeritus School of Medicine, TCD) via a presentation of a silver salver to Prof. Weir by Richard Porter.
- Another long-term collaborator of John Scott and Anne Molloy was Lawrence Brody (NHGRI (NIH), Maryland, USA) who gave a powerful lecture on hunting down metabolic disorders associated with genetic polymorphisms.
- Patrick J. Stover (Cornell University, New York, USA) enlightened us with his latest data on dysfunctional carbon one/folate metabolism and causation of neural tube defects.
- Our final lecture was given by Michael Murphy (MBU, University of Cambridge, UK) who spoke on lack the intracellular control reactive oxygen species production as a cause of neurodegenerative diseases and ageing. The Annual Symposium dinner for speakers and guests was held in the 1592 restaurant in Trinity College and we were delighted that John Scott’s son and daughter, Martin and Rachel were able to attend.
**2nd Irish NMR Meeting and Launch of TBSI NMR Facility**

On 16th April, directly following the Annual TBSI Symposium, the Institute held the “TBSI NMR Facility Opening / 2nd Irish NMR Meeting”, which celebrated the official launch of the 800 MHz and 400 MHz NMR spectrometers. The 800 MHz unit contains the strongest magnetic field in ROI and NI, and as a core facility, will provide world-class capabilities for structural investigations in chemistry, materials, biology, and medicine. Over seventy participants, coming from all corners of the island (unprecedented), joined in scientific discussions. Along with research talks from practically all of the NMR-related academic groups in Ireland and NI, Professors Göran Karlsson (Swedish NMR Centre), Christina Redfield (Univ of Oxford), and Philip Williamson (Univ of Southampton) gave state-of-the-art plenary lectures. The event was sponsored by Agilent Technologies, Dell Computer, VWR Scientific and Sigma-Aldrich.

![Figure 15 Professor Christina Redfield, University of Oxford](image15)

![Figure 16 NMR Facility Opening](image16)

**Irish Motor Neurone Disease Association (IMNDA) and TCD MND Research**

On June 12th the Irish Motor Neurone Disease Association (IMNDA) and TCD MND Research joined forces to host a special “Drink Tea for MND” event in the lead up to MND Global Awareness day (21st June). The event took place in the Knowledge Exchange, TBSI.

Guests were invited to attend the event between 11am-2pm on the day, as Professor Orla Hardiman and her team showcased their recent research updates and poster presentations.

Research themes explored on the day included epidemiology, genetics, neuropsychology, biomarkers, health services and mapping the patient journey, as well as an insight into clinical trials. In addition, tours of the research facility were provided at regular intervals throughout the day. An informal questions and answers session followed in the early afternoon, which proved highly informative for all.

In keeping with the theme “Drink Tea for MND” all those in attendance enjoyed plenty of tea and cake, while mingling with the Academic of Neurology’s research team.

![Figure 17 Professor Orla Hardiman with Mrs Maureen Fitzpatrick and Mr Johnny O’Callaghan](image17)
Joint TCD – IISc Symposium

From Sunday 23rd June - Wednesday 26th June 2013, TBSI welcomed distinguished visitors from the Indian Institute of Science, Bangalore for a joint symposium in Chemistry & Chemical Biology between TCD and the IISc, organised by Prof. Clive Williams, Dean of the Faculty of F.E.M.S.

The symposium in the TBSI Tercentenary Hall was opened by Prof Jane Ohlmeyer, Vice Provost for Global Relations. 26 research presentations were made over a 3 day period by both TCD and IISc researchers, with the Plenary Presentation made by Luke O’Neill. Social events were also a feature of the visit with a welcome on the Sunday, dinner for the speakers hosted by the Provost on Monday and receptions in TBSI on Tuesday and Wednesday.

FUNDING

Award from Wellcome Trust worth €1.8m to support a partnership between Science Gallery and Trinity Biomedical Sciences Institute (TBSI)

The Wellcome Trust is a global charitable foundation dedicated to achieving extraordinary improvements in human and animal health. Its pledge of continued support will enable Science Gallery and TBSI to introduce joint artist in residency programmes and investigate the development of a ‘wet lab’ research area within TBSI which will assist in its ability to deliver specific ‘lab in the gallery’ experiences for visitors. A number of exhibitions on medical themes will also be presented in the coming years.
Opsona Therapeutics: €33m Funding.

Opsona Therapeutics, a Trinity College campus biotechnology company focused on novel therapeutic and preventative approaches to autoimmune and inflammatory diseases announced the completion of an €33m financing. Opsona Therapeutics was founded in 2004 by three of Trinity College Dublin’s immunologists: Professor of Biochemistry, Luke O’Neill and Professor of Experimental Immunology, Kingston Mills – both at the School of Biochemistry and Immunology along with former Professor of Medicine, Dermot Kelleher. Opsona’s research lab is located in TBSI. ‘Opsona is delighted to announce this round of funding which is among the top 5 rounds internationally in the past 12 months’ said Luke O’Neill co-founder and chief scientist.

€3.8 million Funding Award for Dopamine Neuron Research in Brain-Centred Illnesses

Researchers in the School of Biochemistry and Immunology have secured €3.8 million funding for a prestigious Marie Curie PhD training network project, ‘Training in neurodegeneration, therapeutics intervention and neurorepair’ (TINTIN). The research focus is on the dopamine neuron and the role it plays in brain-centred illnesses, such as anxiety, mood disorders, schizophrenia, autism-spectrum disorders, parkinson’s disease, epilepsy, and dementia.

The infrastructure in the newly created Trinity Biomedical Sciences Institute was an important reason for successful funding and it’s Advanced Confocal Imaging and NMR centres will run in-depth training courses as part of the programme.

The Academic Unit of Neurology (under the headship of Professor Orla Hardiman) has successfully been awarded the following:

- HRB Health Research Award (€329,772),
- The Milton Safenozitz Post Doctoral Fellowship for ALS Research ($100,000),
- $100,000 Award from Thierry Latran Foundation.
TBSI and the SCIENCE GALLERY

EPIDEMIC: Going Viral is a week long, summer workshop for 14 to 16 year-old students offered by the School of Biochemistry and Immunology and hosted at the Science Gallery. The programme aims to equip participants with insight into virology, immunity, infection and vaccination through game building, challenges, as well as opportunities for research and laboratory experiments. It’s an in-depth learning experience that challenges participants to think and learn for themselves.

News from Bioengineering:

The MSc in Bioengineering, the only course of its kind in Ireland, is now even more unique. In addition to the award winning MSc in Bioengineering general programme, students can pursue one of three specialisation strands now available: M.Sc. Bioengineering specialising in Neural Engineering; M.Sc. Bioengineering specialising in Regenerative Medicine and M.Sc. Bioengineering specialising in Medical Device Design.

Trinity Centre for Bioengineering is collaborating with Dr Marion Tsanov in the Trinity Institute for Neuroscience who has just been awarded a prestigious Wellcome Trust Research Career Development Fellowship to focus on memory systems. Professor Richard Reilly’s neural engineering group will provide computational methods to elucidate the information content of neuronal spiking patterns, with specific focus on the decoding of the signal processing between striatal and hippocampal memory systems.

TBSI DIGITAL SIGNAGE

The lift lobby screens on each of the floors can be used by all areas within TBSI to upload information. Contact Caroline if you require information on this at clevis@tcd.ie

TBSI SHARED SERVICES

TBSI is delighted to welcome Liam O’Ceallaigh to Shared Services. Liam is a welcome addition to the group and will enable additional services to be provided within TBSI.
PRIZES & AWARDS

The Best Strategic & Innovative Thinking

Congratulations to Christopher Davitt of the Lavelle lab who was awarded the prize for "The Best Strategic & Innovative Thinking" in the prestigious Accenture Leaders of tomorrow competition.

What Christopher said about winning the award: "Altogether it was an incredible experience. Learning from some of the highest achieving business people in Ireland and having my business idea validated and awarded by a Fortune 500 consulting firm is really an unbelievable feeling!"

Provost’s Teaching Awards 2013

The Provost’s Teaching Award Scheme is designed to recognise and reward those who have made an outstanding contribution in the pursuit of teaching excellence. The prestige of the award reflects the value which Trinity places on promoting teaching as a scholarly activity and the importance placed on enriching the learning opportunities of its students.

Congratulations to Luke O’Neill, winner of one of this year’s awards. Peer reviewer feedback was:

“He always has new jokes to crack, clever ways of illustrating his ideas and data and a turn of phrase that regularly raises a laugh. People always leave Luke’s lectures chattering and smiling. The undergraduates are always so proud to have been in his classes, and having Luke lecture a module guarantees a full house.”

Inhouse booklet

In April we produced a booklet entitled ‘A Snapshot of TBSI’. Read about what’s happening in Ireland’s premier Biomedical Sciences research laboratories. Please see our website or click here for full booklet.
EVENTS IN TBSI

The Stanley Quek Hall, Tercentenary Hall, Seminar Rooms and the Knowledge Exchange have been put to great use for many conferences, seminars and other events including:

- PRTLI MolCellBio External Advisory Meeting, 30th January 2013
- Training Course under EU COST Programme “Pharmacological Models of Inflammatory and Immunological Disorders”, 30th January to 2nd February
- School of Medicine Review Poster Session, 5th February 2013
- Public lecture by Colm Cunningham: “Dysfunction, depression, delirium: what happens when the brain gets inflamed?”, 6th February 2013
- Special Seminar with Prof. Stephen O’Rahilly, University of Cambridge, “Human metabolic disease: lessons from genetics”, 15th February 2013
- Emergency Medicine Student Society of Ireland, 21st February 2013
- TCD Biological Society Reception, 21st February 2013
- Public Lecture by Kingston Mills: “Vaccines – not just for infection: How we can target the immune system to control cancer, Alzheimer’s and autoimmune diseases”, 27th February 2013
- MSc Bio-Engineering Seminar, 27th February 2013
- B & I Conference, 28th February 2013
- Chinese Alumni Meeting, 2nd March 2013
- Trinity En-Age, 7th March 2013
- M.O.V.E. Reception, 8th March 2013
- BRU / IMB Working Lunch, 11th March 2013
- TCD Friends of Medicine San Frontiere, 14th March 2013
- Public Lecture by James Murray: “Cannibalism, cancer and chemotherapy”, 20th March 2013
- Med Mix, TCD/UCD, 27th March 2013
- School of Medicine Poster Session, 28th March 2013
- B&I Senior Sophister Poster Day, 4th April 2013
- School of Medicine 1st Year Projects Day, 5th April 2013
- Public Lecture by Andrew Bowie: “Exploiting the enemy: what we can learn from the virus-host arms race”, 10th April 2013.
- Visit by Ambassador Tom Hanney and the members of EU Committee COREPER I, 11th April 2013
- TSMJ / Swan Lecture, 12th April 2013
- Annual TBSI Symposium “Metabolism and Metabolic Diseases”, 15th April 2013
- 2nd Irish NMR meeting and TBSI NMR facility launch, 16th April 2013
- Tumour Microenvironment, 17th April 2013
- European Workshop on Cannabinoid Research, 18th – 20th April 2013
- Biochem Society Luncheon Talks, 18th and 24th April 2013
- Visit by Board of European Investment Bank, 29th April 2013
- EIT Conference, 29th and 30th April 2013
- i Foster (EIT Conference), 30th April 2013
- James Watson Visit, 30th April 2013
- Public lecture by Derek Nolan: “It’s in the blood: Sleeping Sickness the Scourge of a Continent”, 1st May 2013
- Irish Neurological Association Meeting, 9th – 11th May 2013
- Biochem Society Luncheon Talk, 16th May 2013
- Visit by Deval Patrick, Governor of Massachusetts, Q&A, 16th May 2013
- Meeting of EU Consortium “International Network on Microvesicles and Exosomes in Health and Disease”, 16th and 17th May 2013
- Bio-Chemistry 4th year prizegiving, 17th May 2013
- E-IRG Meetings, HEAnet Event, 22nd and 23rd May 2013
- ChemComm-RSC Prizes and Awards Symposium, 24th May 2013
- Animal Technicians Seminar, 28th and 29th May 2013
- GE Western Blotting Seminar, 29th May 2013
- Health XL Investor Day, 30th May 2013
- Lennox Labs Exhibitors Day, 5th June 2013
- 3rd annual Irish Next Generation Sequencing Meeting, 10th June 2013
- Irish Motor Neurone Disease Association (IMNDA) and TCD MND Research “Drink Tea for MND” event, 12th June 2013
- ITS Nano Meeting, 17th – 19th June 2013
- Inaugural lecture of Professor Yuri Volkov, 17th June 2013
- EU INBIONET WORKSHOP 1 “Advanced topics in innate immune signaling: from basic mechanisms to pathogen detection and evasion”, 17th – 21st June 2013
- Visit by Mr Hannes Swoboda, chairman of the Group of the Progressive Alliance of Socialists and Democrats in the European Parliament, 24th June 2013.
- Joint TCD-IISc (Bangalore) Symposium in Chemistry and Chemical Biology, 24th – 26th June 2013

Upcoming Events

Other dates for your diary 2013
5th + 6th Sept 2013: StaphGBI conference
8th – 11th Sept 2013: Immunology Conference
12th + 13th Sept 2013: International Anatomical Society Meeting
18th – 20th Sept 2013: Cancer Conference
16th October 2013: RIA Hamilton Lecture with Roger Penrose
29th October 2013: Postdoc Research Day
3rd December 2013: TBSI Entrepreneur Day

FEEDBACK

There are many challenges at this stage of TBSI’s development and we are working through them. Please provide us with feedback, ideas and also news (apologies for any omissions) as we aim to establish TBSI as an Institute of which we can all be proud.

News Items

Mail to clevis@tcd.ie for inclusion in next newsletter (remember ‘less is more’).