A warm welcome to the second newsletter of TBSI. As ever a lot has been happening, from ongoing exciting discoveries, to postdoc and postgrad get-togethers and visits from a host of different people. We present a snapshot of activities and encourage you to keep us informed.

Luke O’Neill
Academic Director

Discoveries

Research carried out by Dr. David Finlay

Dr David Finlay of the School of Biochemistry and Immunology, working with Prof Doreen Cantrell’s laboratory in the University of Dundee, has established that the activities of two proteins, mTORC1 and HIF1α, are essential to maintain the function of cytotoxic T cells (CTL), key anti-viral and anti-tumor immune cells. Disruption of mTORC1 or HIF1α dramatically reduces glucose utilisation in CTL while also disrupting the levels of key molecules that are required for normal migration and target cell killing. This work affords new insight into the relationship between cellular metabolism and cellular function in immune cells and was recently published in the Journal of Experimental Medicine.

Self-Eating Cells May Hold key to New Inflammatory Therapies.

Research just carried out in the Immunology Research Centre, led by Dr. James Harris, based in the School of Biochemistry and Immunology, shows that a process of autophagy regulates the production of inflammatory molecules and may therefore represent an effective target for the development of...
new anti-inflammatory therapeutics. The findings have been recently published online in the Journal of Immunology.

Inflammation is a key component of immune responses to infection, but when uncontrolled can lead to autoimmune diseases like Crohn's disease, rheumatoid arthritis, type 1 diabetes, ankylosing spondylitis, lupus, psoriasis and multiple sclerosis. In these diseases inflammation is mediated by molecules of the immune system called cytokines and cells that respond to these cytokines called T cells. Autophagy appears to be an important controlling mechanism of cytokines.

**SFI announced the successful applicants in TBSI on Friday, January 25th 2013**

TBSI investigators have yet again proven to be very successful at obtaining SFI funding. We heartily congratulate them. A total of €13,846,850 was allocated to research in TBSI, of which €10,463,792 was awarded to researchers in Biochemistry and Immunology. The successful applicants and their projects are as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Project</th>
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<tbody>
<tr>
<td>Martin Caffrey</td>
<td>Membrane Structural and Functional Biology. Tackling communicable and non-communicable diseases at the membrane level.</td>
</tr>
<tr>
<td>Stephen Connan</td>
<td>Anhydrides as nucleophiles in new catalytic asymmetric processes: development, scope expansion and application in drug development</td>
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<tr>
<td>Emma Creagh</td>
<td>Identification &amp; Functional Characterisation of Novel Inflammatory Mediators.</td>
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<tr>
<td>David Finlay</td>
<td>Characterising the role of mammalian Target Of Rapamycin Complex 1 (mTORC1)/Srebp1c signalling in directing the differentiation and function of T cell subsets.</td>
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<tr>
<td>Daniel J Kelly</td>
<td>A tissue engineered biological joint replacement prosthesis for the treatment of degenerative joint disease</td>
</tr>
<tr>
<td>Amir Khan</td>
<td>Molecular Aspects of Immune Evasion and Subversion of Membrane Trafficking by Pathogens</td>
</tr>
<tr>
<td>Ed Lavelle</td>
<td>Modulation of innate and adaptive immunity by particulate adjuvants for improved parenteral and mucosal vaccination</td>
</tr>
<tr>
<td>Rachel McLoughlin</td>
<td>Understanding cellular immunity to Staphylococcus aureus is required for novel anti-S. aureus vaccine design</td>
</tr>
<tr>
<td>David O’Connell</td>
<td>Novel affinity matrices for purification of biotherapeutics</td>
</tr>
<tr>
<td>Cliona O’Farrelly</td>
<td>Is Natural Resistance to Hepatitis C in an Irish Cohort Associated with JAK/STAT Resistance to HCV Targeting? Towards New Anti-Viral Strategies</td>
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Dunsink Retreat

The TBSI management group held a strategic meeting at Dunsink Observatory on 21st November 2012. This was a fitting location since it was the first ever Trinity College Research Institute. The development of TBSI to date was discussed and future plans were proposed. They were joined by the Dean of Research and Professor David Lloyd (Bursar and Director of Strategic Innovation) We thank Professor Luke Drury, Dublin Institute for Advanced Studies, for kindly providing the venue (which was TCD’s first ever major investment in research) for free.

SFI-link to Nobel-winning research

SFI-funded researcher Professor Martin Caffrey (School of Biochemistry and Immunology) has worked with Professor Brian Kobilka (Nobel Prize for Chemistry 2012) of Stanford University to help figure out the crystal structure of GPCRs. Knowing the structure, or shape, of these molecules will help us understand how they function in the body. However, isolating and crystallising GPCRs is no easy feat. The tiny proteins cross the thin fatty membrane that surrounds each cell, so one portion of the receptor is outside the cell to ‘catch’ the signal and another portion is inside the cell to relay the information to the cell’s interior.

Prof. Caffrey has developed a high-throughput way to crystallise the fragile GPCRs obtained from the membranes and keep them intact so that their shape can be studied. First, the receptor is gently removed from the fatty membrane using a mild detergent. Then it is put into toothpaste-like viscous substance called mesophase, in which the GPCRs can form crystals. He first met Prof Kobilka at a Keystone Symposium on GPCRs in Killarney in 2008 and they struck up collaboration. Prof. Caffrey’s group (then at the University of Limerick) used the mesophase technology to grow crystals of a GPCR called the β2-adrenergic receptor, which responds to adrenaline in the ‘fight or flight’ response when we get a shock. “Brian needed support for the in meso crystallogenesis aspect of his on-going β2-adrenergic receptor structure work and I was more than happy to get involved,” recalls Prof. Caffrey, who heads the Membrane Structural and Functional Biology Group at Trinity.
TCD, UCD and RCSI Launch Biomedical Engineering Collaboration to Accelerate Innovative Health Care Technologies

Ireland’s leading engineers, physicians and scientists are joining forces to develop 21st century health care devices and technologies in a new collaboration of the Dublin Biomedical Engineering Research Initiative (DBERI) announced this week. The new initiative will lead on many new technologies at the frontier of medical innovation, including stem cell based tissue engineering, regenerative therapies for orthopaedic medicine, valve repair devices for damaged hearts and imaging systems for neurology.

The primary objectives of the Dublin Biomedical Engineering Research Initiative (DBERI) are to foster engagement between clinical specialisations, engineering and science. It will provide a focus for collaborative research, education and commercialisationdevelopment activities, maximising the synergies and capitalising on its breadth of expertise. It will also increase the connectivity between the medical technologies industry sector, academics and clinicians.

To read more, click on link recent discoveries or go to www.tcd.ie/biosciences

Immune Wars: Bugs & Beyond’ Outreach Programme Teaches Children About Bacteria

Figure 10 Raymond Stallings, Danny Kelly and Vinny Cahill

Figure 11 Prof Fergal O’Brien, RCSI, Dr Danny Kelly, Director of the TRinity Centre for Bioengineering, Dr Liam Breen TCD

Figure 12 Jim Harris has the children's full attention

Figure 13 Jim Harris, Nigel Stevenson, Rachel McLoughlin and Cliona O’Farrelly
Immunology researchers in TBSI were awarded a Royal Dublin Society Science Live Demonstration Bursary to develop an interactive demonstration to introduce children to the microbial world of bacteria and the concept of the protective immune system.

The ‘Immune Wars: Bugs & Beyond’ demonstration lecture shows students the microorganisms that live all around us and can potentially infect us. It allows the children to visualise the bugs up close introducing the immune system’s response as ‘Defenders of our health’, and discusses how the body’s immune cells (phagocytes) attack and kill invading bacteria ensuring that we stay healthy.

To communicate these complex scientific concepts to the children researchers at the School of Biochemistry and Immunology Drs Rachel McLoughlin, Nigel Stevenson, James Harris and Professor Cliona O’Farrelly created a short movie based on their work TBSI and developed a game of ‘Phagocyte Catch’ which involved the children splitting into teams of ‘bacteria’ and the ‘phagocytes’. The bacteria were equipped with plastic balls and their goal is to infect the ‘body’ (a paddling pool). At the same time the phagocytes are equipped with fishing nets and must defend the body.

Trinity Showcases Leading Edge Advances in Innovation and Technology

Mitral Valve Replacement (MiVaR) Device

Bruce Murphy and his team in Bioengineering have developed a device which is a self-expandable bio-prosthetic valve replacement device that can be positioned across a dysfunctional valve using conventional minimally invasive percutaneous techniques. The MiVaR device basically replaces a patient’s dysfunctional mitral valve. Liam Breen presented the valve for the first time at the TBSI Postdoc day on 18th September.

Researchers: Bruce Murphy, Jim Crowley, Liam Breen

Nigel Stevenson’s research was featured in HRB’s publication

Nigel Stevenson, School of Biochemistry and Immunology, had his research published...‘Snapshot of Health: HRB-funded research 2012’. Many people with HCV (hepatitis C virus) do not respond to interferon therapy, the standard treatment for HCV infection. This HRB funded research is finding that the normal signalling pathway for interferon is disrupted in patients infected with a genotype 1 subgroup of HCV. “We are investigating the mechanism by which HCV avoids being destroyed,” says Dr Stevenson. “We have identified specific regions within HCV that we believe hijack the cell’s own machinery to de-grade essential proteins within the anti-viral interferon pathway – therefore, these HRB investigations are pointing the way to developing potentially novel therapeutics.” The HRB has just awarded Nigel’s Intracellular Immunology group a new grant to also investigate the effects of HIV upon innate immune signalling and develop molecules de-signed to block HCV and HIV from interfering with these anti-viral responses.

News from the National Neuroscience Centre

The Unit of Neurology has been set up and their web site is live at Academic Unit of Neurology. By clicking on this link you will be able to watch and listen to their Documentary (The Inside Track) which been nominated for an IFTA.
Dr. Peter Bede has been awarded a 5 year Clinician Scientist Research Fellowship in Neuroimaging which is funded by Elan. Peter is a specialist registrar in Neurology with a focus on Motor Neurone Disease (MND) and advanced Magnetic Resonance Imaging (MRI) techniques, Dr. Bede was awarded a Health Research Board Research Fellowship in 2009 to develop MRI biomarkers in MND. As the clinical role of conventional MRI in MND is limited to the exclusion of alternative diagnoses, Dr. Bede uses novel quantitative methods to capture and measure MND specific changes in the brain and spinal cord. To read more on the Irish Motor Neurone Disease research group use this link.

The Irish Brain Council held its first meeting at TBSI in December 2012. The Irish Neurological Association Annual meeting will take place in TBSI on 09th-11th May 2013.

During the past 12 months Professor Orla Hardiman has successfully received two HRB Grants each to the value of €1 million. The Clinician Scientist Award and the HRB Interdisciplinary Capacity Enhancement Award. She has also received the Lundbeck Award in Neurology, Psychiatry and Geriatrics to the value of €20,000.

NMR Update
Both NMR’s are now fully operational. The recently completed 800 MHz (18.8 T) NMR spectrometer is a 4.2 K ultra-high field unit and is the strongest magnetic field on this island. It is equipped with a variety of probes including a newly-designed state-of-the-art triple-resonance cold probe and two solid-state MAS probes, and is situated in a purpose-built double-tiered room within the Institute. During a recent visit by Goran Karlsson of the University of Gothenberg, samples were run to compare to the output of a 900MHz unit in Sweden. The results were very favourable. Collaborative projects have already commenced with institutions in Sweden, the USA, and within Ireland, and thanks to TBSI’s leadership position in Cancer Research, Immunology and Bioengineering, the facility will be able to support both cutting-edge upstream discoveries and translational developments. The NMR facilities in TBSI will be formally launched as part of the TBSI symposium/NMR event on 15th and 16th April 2013.

Digital Signage
The lift lobby screens on each of the floors have been in use since April. Each area within TBSI has access to upload information. Contact Caroline if you require information on this at clevis@tcd.ie

Shared Services
The Shared Services group is working with the Treasurer’s Office on the development of the FIS system. This project is now at conference room pilot stage and phase 1 will go live later in the year. Development of store services will be implemented in Q2, 2013.
Major Events

Presentation to David Lloyd
Following a TBSI seminar given on 7th December 2012 by Dr. Chas Bountra, Structural Genomics Consortium, University of Oxford, David Lloyd was presented with a picture of TBSI as a parting gesture of thanks for all his efforts in establishing TBSI. We wish him well in his new post as Vice Chancellor and President of the University of South Australia.

Visit by representatives of the US State Department
On the afternoon of 14th November, a US delegation visited TBSI. As part of the visit there was an event in the Tercentenary Hall. The contingent consisted of US political representatives of Secretary of State Hilary Clinton and up to 25 US industry personnel. There were talks by Dr Kerri-Ann Jones and Kris Balderston followed by a Q&A session. Watch YouTube Kris Balderston & Kerri-Ann Jones In Dublin

- Kris Balderston, Secretary Clinton’s Special Representative for Global Partnerships.
  Kris holds his BA in Political Science from LeMoyne College and his MA in Government from Georgetown University
- Dr Kerri-Ann Jones, Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs
  Dr. Jones obtained her Ph.D. from the Department of Molecular Biophysics and Biochemistry at Yale University, where she studied the effects of stress on protein expression and metabolism, using
nuclear magnetic resonance. Before her graduate study, she worked as an assistant for research at the Rockefeller University in immunology and development biology. She holds a bachelor’s degree in chemistry from Barnard College, Columbia University.

**Postdoc and Postgrad Associations**

It was a busy last quarter of 2012 for both the TBSI Postdoc and Postgrad Societies.

**Postdocs**

Dr. Shona D’Arcy from Bio-Engineering presented her research titled “A tele-health technology for measuring inhaler compliance” at the Postdoc Research Seminar Series on November 12th. Ciara Keane from Biochemistry and Immunology arranged for the postdocs to ring out 2012 in style with a Xmas Gathering on December 18th.

A number of postdocs on the committee will be stepping down this year and therefore, it would be great to have some fresh faces and ideas to plan the schedule of events for 2013. If you are interested in getting involved please contact Annie Curtis from Biochemistry and Immunology: acurtis@tcd.ie

**Postgrads**

On December 5th 2012 the post-graduate society held its first event, an informal meet and greet in the format of a table quiz. It was a fantastic opportunity for students from different disciplines to discuss their area of research in the hope of strengthening interdisciplinary collaboration. It was a massive success with attendance exceeding 100 people and will be followed with another event in 2013 which aims to give students the opportunity to present their work in a slightly more formal setting. More volunteers are always welcome in the committee; anyone who is interested in joining should contact the head of the committee Eamon Sheehy (sheehyej@tcd.ie).

**Visit from Treasurer’s Office**

In 2008, the Treasurer’s Office established an “Outreach Programme” to offer staff the opportunity to gain a better understanding of the various aspects of College life. To date there have been 28 visits to different parts of College, including a visit to TBSI in 2012 which consisted of a tour of the building given by Tony Byrne. As a flagship building for both the College and the city, Treasurer’s Office staff were delighted with the chance to have such a comprehensive and interactive viewing of the TBSI and to get a sense of where some of the key research activity of the College will take place over the coming years. All those who participated in ‘a day in the life of TBSI’ thoroughly enjoyed the event and were hugely appreciative of the opportunity to gain such an insight into the work of their research colleagues.
Prizes & Awards

GOLD for Luke O’Neill

Professor Luke O’Neill, Director of the Trinity Biomedical Sciences Institute and Professor of Biochemistry, Trinity College Dublin has been presented the Royal Irish Academy Gold Medal in recognition of his outstanding contribution to the Life Sciences. Professor Dermot Moran, UCD Philosopher, was awarded the RIA Gold Medal for the humanities.

Luke O’Neill is recognised as a world leader in the fields of immunology and inflammatory diseases such as rheumatoid arthritis. His basic discoveries helped redefine the field of innate immunity and were a key aspect of the emergence of new insights into this important process for host defence and inflammation.

Leonardo UGIS award

Silvia Giordani received the LEONARDO UGIS award for a young researcher/communicator on December 3rd in Milan, Italy. The prestigious prize, intended to recognise both outstanding scientific achievements and excellent communication skills of young researchers, is awarded by the Italian National Museum of Science and Technology, the Italian Scientific Journalists Union – the ‘Unione Giornalisti Italiani Scientifici’ (UGIS) and Federchimica – PlasticsEurope Italia.

Silvia also received the Rotary International Paul Harris Fellow award on December 17th in Bergamo, Italy.
RAMI silver medal

Congratulations to Richard Reilly who delivered the Samuel Haughton lecture at the Annual Bioengineering in Ireland Conference (January 2013) and was awarded the RAMI silver medal.

The conference was chaired by Dr. Daniel Kelly, Director of TCBE

Young Investigator Award

Congratulations to Rebecca Coll, School of Biochemistry and Immunology who won the Young Investigator Award at the recent International Endotoxin and Innate Immunity Society meeting, Tokyo, Japan.

Dr Coll presented her research into endotoxin signalling.

M.Sc. in Bioengineering wins award

The M.Sc. in Bioengineering, received the Engineers Ireland Education award for demonstrating excellence in the field of engineering education.

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:

- Workshop in Molecular Imaging, 10th-14th September 2012
- QS University World Ranking Day, 11th September 2012
- PostDoc Research Day, 18th September 2012
- School of Medicine Postgrad Research Day, 20th September 2012
Newsletter

January 2013

- Healthcare Professional Event with Coeliac Society Ireland, 21st September 2012
- Fragile X Society Meeting, 22nd September 2012
- Emergency Medicine, 24th September 2012
- Chemistry Symposium and “Fun-Day”, 27th September 2012
- Trinity Centre for Bioengineering Seminar: “Strategies for articular cartilage regeneration”, 28th September 2012
- Disorders of Mental Health, 29th September 2012
- Strategic Board for Hospitals Group, 3rd October 2012
- Irish Architecture Federation “Open House”, 7th October 2012
- Bio-Chemistry Society Inaugural Talks, 24th October 2012
- Prof. Sean Colgan, University of Colorado, Lecture, 24th October 2012
- Ageing lecture, 24th October 2012
- Public lecture by Richie Porter “Human metabolism and the weighty subject of obesity”, 30th October 2012
- Irish Area Section of the Biochemical Society (IASBS) Meeting entitled: "Regulation of Metabolism in Cancer and Immune Cells”, 8th and 9th November 2012
- School of English public debate with Sir Terry Pratchett, OBE, “This house would see Unseen University run by witches”, 12th November 2012
- US State Department Delegation visit and seminar “How innovation and science policy can inspire entrepreneurship to solve real world problems”, with talks by Dr Kerri-Ann Jones and Kris Balderston, 14th November 2012
- Public lecture by Gavin Davey “Why stem cells?”, 21st November 2012
- College Open Days Presentations re Health Sciences, 30th November and 1st December 2012
- Fluorochem Roadshow, 5th December 2012
- Seminar with Chas Bountra “How can we work together to accelerate the discovery of pioneer medicines for inflammatory diseases?”, 7th December 2013
- Public lecture by Cliona O’Farrelly “Hepatitis C virus: deadly, dangerous or docile?”, 12th December 2012
- Public lecture by Jean Fletcher “Why do people get multiple sclerosis?”, 16th January 2013
- Irish Hand Surgery Society Teaching Event, at the Anatomy Dept, 10th and 11th January 2013
- Pharmacy symposium, 29th January 2013

Upcoming Events

The B&I series of public lectures continues:
6th February  Colm Cunningham
27th February  Kingston Mills
20th March  James Murray
10th April  Andrew Bowie
1st May  Derek Nolan

For details see Public Lectures - News & Events - School of Biochemistry and Immunology - Trinity College Dublin
Other dates for your diary 2013

18th + 19th April 2013: European Cannabinoid Workshop
15th + 16th April 2013: International symposium with high profile speakers on metabolism and NMR technology. The TBSI NMR facilities will also be formally launched.
9th + 10th May 2013: The 49th annual meeting of the Irish Neurological Association (president Professor Orla Hardiman). See www.iicn.ie or email info@iicn.ie
13th – 16th June 2013: Liver Immunology Conference
24th – 26th June 2013: Biochemistry Symposium between the Indian Institute of Science, Bangalore and the School of Biochemistry & Immunology
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

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’).