In this Issue

Read about our latest research in breast cancer

Hear about our most recent fundraising activities

Check out details of our latest seminars & workshops

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**Director’s Message**

So, we are half-way there.

BREAST-PREDICT is now in full steam, with very significant progress now having been made across all five of our work packages. Notable recent output publications have been made in high-ranking journals, such as JNCI, Genes & Development and Cancer Discovery.

Of particular note during the last period was our involvement in 'The Patient Voice in Cancer Research' event held in UCD on 13th April 2016. I was delighted to address the assembled group of patients, patient survivors, family members, advocates, researchers and funders in the interactive session held. We plan to be involved in a follow-on morning event being held in UCD as part of Cancer Week on 19th October 2016. In the afternoon of the same day, we will be having a special BREAST-PREDICT session, which will feature a combination of selected talks from our research programme, along with our new SAB members (Prof. Anne–Lise Barresen-Dale, Prof. Klaus Pantel, Prof. Pernette Verschure and Prof. Robert Coleman).

Anyway, let’s keep up the excellent progress we have made over the last 2.5 years!

Professor William Gallagher
Director, BREAST-PREDICT

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**New team members**

The BREAST-PREDICT centre now consists of over 50 researchers nationwide.

Recent additions to the team include Dr Bruce Moran, a postdoctoral fellow who will be providing core bioinformatics support to the Centre; Dr. Rut Klinger, a translational research co-ordinator who will be working on the molecular epidemiology and biomarker studies under WP2 and WP5; Dr. Alexandra Canonici, who has joined the Centre as a postdoctoral fellow working under the mentorship of Dr. Norma O’Sullivan; and Deirdre Winrow, a research assistant working for Dr. Norma O’Sullivan on WP5 activities.

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**BREAST-PREDICT review meeting**

The BREAST-PREDICT team held their 30 month update meeting at the Kingsley Hotel in Cork in February 2016. With over 40 researchers in attendance, the purpose of this meeting was for all members to get an update as to the progress of the research programme in Year 3.

Prof. William Gallagher kicked off the meeting with an overview of the key BREAST-PREDICT outputs to date, this was followed by presentations from each of the different work-packages within the BREAST-PREDICT programme. This was a very constructive meeting with discussions on the research being undertaken thus far and importantly, planning for the future direction of the Centre as it enters the second half of its programme.

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**Conferences**

Following on from our update meeting, members of the team attended the Irish Association for Cancer Research Annual Meeting which was also held in the Kingsley Hotel in Cork.

New to the agenda this year was a career and outreach session for early stage researchers. This included talks from scientists that had worked in both academia and industry, as well as clinical trial organisations and charities. Dr. Verena Murphy gave a fantastic talk about her roller-coaster career journey as a PhD student in the University of Zurich through to her position as Clinical Programme Leader of Cancer Trials Ireland. Also in attendance, was BREAST-PREDICT sponsored speaker Gráinne Faller who discussed the importance of science communication.

Five team members gave oral presentations at the conference this year, including Elspeth Ward, Louise Walsh and Lisa Dwane who updated the audience on their PhD research. There were also several poster presentations, with 12 researchers presenting data from their BREAST-PREDICT projects.
A novel cancer diagnostic test can accurately predict a patient’s response to treatment

New research undertaken by Prof. Bryan Hennessy’s team in RCSI was recently published in the *Journal of National Cancer Institute*. This study led by BREAST–PREDICT researchers, Dr. Sinead Toomey and Dr. Alex Eustace, utilised a diagnostic test to predict which HER2-positive breast cancer patients would respond to chemotherapy.

HER2–positive breast cancer tests positive for a protein called human epidermal growth factor receptor 2 (HER2), which promotes the growth of cancer cells. This type of breast cancer tends to be more aggressive; however, treatments that specifically target HER2 are very effective. Drug treatments called targeted therapies have been developed specifically to treat HER2–positive breast cancer, including the drugs trastuzumab (Herceptin®) and lapatinib.

Many patients with this type of breast cancer now receive treatment with chemotherapy and trastuzumab and/or lapatinib before surgery. This is called neoadjuvant therapy. Often, this shrinks the tumour so much that there is no tumour remaining at the time of the patient’s surgery. This is known as a pathological complete response (pCR). Currently, oncologists cannot tell which of their patients will have a pCR until after the treatment is completed meaning that many patients continue to receive ineffective therapies.

The group in RCSI used the RNA Disruption Assay (RDA™), a cancer diagnostic test to measure response early in chemotherapy treatment. Biopsy samples were taken from HER2-positive breast cancer patients enrolled on a clinical trial, after the 1st cycle of trastuzumab. Importantly, this test was capable of predicting patient’s response to this therapy, and identified that patients with higher RDA scores (more than 7) had a much greater chance of achieving a pCR than patients with lower RDA scores.

This test may be useful to measure individual patient response to neoadjuvant therapy, at a time when the patient can avoid further toxic treatments that specifically target HER2. Often, this shrinks the tumour so much that there is no tumour remaining at the time of the patient’s surgery. This is known as a pathological complete response (pCR). Currently, oncologists cannot tell which of their patients will have a pCR until after the treatment is completed meaning that many patients continue to receive ineffective therapies.


BREAST-PREDICT researchers discover a new idea to eliminate ‘Cancer Stem Cells’

Often, treating a cancer patient with chemotherapy or radiation does not work out as planned. The tumour shrinks at first, but the cancer stem cells within the tumour can survive, causing a more aggressive cancer to reoccur. A key feature of the ability of cancer stem cells to survive these standard cancer treatments is that they predominantly exist in a dormant or non–dividing state, called ‘cellular quiescence’, while current treatments are most effective against dividing cells. Therefore, a key challenge is to develop a means to target cancer stem cells and knock them out of their dormant quiescent state so they can then be killed by standard cancer therapies.

A significant breakthrough addressing this challenge has been made by BREAST–PREDICT researchers from TCD, led by Dr. Adrian Bracken. The research, which was published in the journal *Genes and Development* in November 2016, discovered a novel function for Polycomb-Like Protein 1 (PCL1), a protein normally involved in regulating cellular identity. This protein was found to bind to and boost the function of the p53 protein, one of the most famous cancer associated proteins, and that this is required for the ability of p53 to activate cellular quiescence.

The discovery that PCL1 has acquired a new function during the relatively recent evolution of mammals is very interesting, but the realisation that the function of the p53 protein, one of the most famous cancer associated proteins, and that this is required for the ability of p53 to activate cellular quiescence.

To Dr. Alex Eustace who won the St Luke’s Young Investigator Award 2016 from the Royal Academy of Medicine/St Luke’s Hospital. Prof. Bryan Hennessy was also awarded the highly prestigious St Luke’s Silver Medal, and presented the 2016 41st St Luke’s Lecture entitled ‘From biology to treatment – how understanding of the PI3K pathway has influenced cancer research and therapy’.

To Prof. Walter Kolch who was elected as a member of the Royal Irish Academy in May 2016, which represents the highest academic honour in Ireland. Prof. Kolch is currently director of Systems Biology Ireland and was one of seven academics elected to the academy for their outstanding contribution to science.

Irish Cancer Society BREAST-PREDICT
Excitingly, BREAST-PREDICT is now half-way through its programme of research, and has achieved numerous key outputs and milestones over the past two and a half years. Notably, the team have published over 45 articles, won over 20 awards, accrued over 1700 patients across 9 Cancer Trials Ireland (formerly ICORG)-affiliated trials, and have leveraged over €16.8 million in additional funding to date.

To mark these achievements, we held a mid-way point celebration and research symposium on March 31st 2016, which included talks by a number of team members on their significant contributions to the research programme. Second year TCD PhD student Michelle Lowry was first to speak at the event, presenting her recent publication on the role of miR-134 in extracellular vesicles in triple negative breast cancer; this was followed by presentations from postdoctoral researchers Dr. Damir Varešlija and Dr. Alex Eustace, who talked about their recent BREAST-PREDICT publications and achievements. Prof. Kathleen Bennett subsequently presented on her group’s research on pre-and post-diagnosis aspirin use on breast cancer outcome. Finally, Dr. Darran O’Connor updated the group on the work being undertaken in his laboratory to identify novel therapeutic targets for breast cancer. Also invited to participate in this symposium were guest speakers, Dr. Alexander Kel from GeneXplain who has expertise in various bioinformatic algorithms, and Dr. Davina Gale from Invitara who presented on the area of circulating tumour DNA in cancer.

In celebration of the midway point, we held the first BREAST-PREDICT elevator pitch award for early stage researchers. The aim of this award was to encourage young researchers to pitch a spin-out project that encompassed cross-fertilisation between different work-packages, and involved working with BREAST-PREDICT team members that they had not interacted with previously.

We had five excellent applications, all of who were given the opportunity to “pitch” their five slide concept in five minutes to the audience. While the competition was very close, our guest speaker judges awarded the prize to Louise Walsh for her excellent pitch. Louise has won €5000 to undertake a research project in collaboration with Eric Conway, TCD; Elspeth Ward, RCSI; Dr. Sudipto Das, RCSI; and Dr. Ailis Fagan, RCSI. Notably, this project will involve the interaction between BREAST-PREDICT work packages 3 and 4.

**Fundraising activities**

**Daffodil Day 2016**

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Cancer Trials Ireland (formerly ICORG) have re-branded

To coincide with International Clinical Trials Day on 20th May 2016, one of the core partners involved in BREAST-PREDICT, Cancer Trials Ireland (formerly ICORG) launched their new name and brand. To mark this occasion, Cancer Trials Ireland have rolled out their new “Just Ask” campaign, aimed at encouraging cancer patients to just ask their healthcare providers for any information on cancer trials. Since its launch in 1996, Cancer Trials Ireland have managed over 350 clinical trials and provided over 15,000 patients in Ireland with access to cutting edge cancer trials. For more information please visit www.cancertrials.ie.

**Relay for Life and Colour Dash 2016**

BREAST-PREDICT researchers took part in the Relay for Life in UCD on April 13th 2016, a 24 hour event focused on remembering those whose lives have been touched by cancer. 25 researchers from the Conway Institute participated in this event, raising funds to support research and services for Irish Cancer Society. Members of the BREAST-PREDICT team, and the Cancer Biology and Therapeutics Lab in UCD participated in the Irish Cancer Society 5 Km Colour Dash on Saturday 18th June 2016. This annual fun run in which participants are pelted in powdered paint during the route is held every year in the Phoenix Park.

**Funding News**

Additional funding is a key aspect to ensure the sustainability of the BREAST-PREDICT centre beyond October 2018. To date, the BREAST-PREDICT team have leveraged over €16.8 million in additional funding including €12.8 million from academic funding bodies and €4 million from industry sources.

Congratulations to Prof. William Gallagher who has successfully obtained a €1.96 million Science Foundation Ireland Investigators Programme Award 2015. Prof. Gallagher will work with co-applicant Prof. William Watson on this four year research grant. This project, entitled ‘Optimal Management of GenderSpecific Cancers via Efficient Use of Protein Profiling, Digital Pathology and Systems Medicine Tools (OPTI-PREDICT)’ will involve the validation and clinical implementation of decision support systems for early stage breast and prostate cancer.

Michelle Lowry and Dr. Alex Eustace present at the mid-way point research symposium.

Dr. Alexander Kel & Dr. Davina Gale

Louise Walsh, winner of the first BREAST-PREDICT elevator pitch

Davina Gale & Dr. Alexander Kel

The BREAST-PREDICT Colour Dash team

Prof. William Gallagher & Prof. Amanda McCann

**Prof. William Gallagher is appointed Director of the Conway Institute**

Congratulations to Prof. William Gallagher who was recently appointed as Director of the Conway Institute for Biomolecular and Biomedical Research in April 2016, replacing Prof. Walter Kolch who is stepping down from the role. The function of this position is to oversee the day to day operations and strategic development of the Institute, with the assistance of the directorate team. When asked about the new role, Prof. Gallagher stated that he was excited about the new position and “looked forward to working to further advance the UCD Conway Institutes mission to be a world leader in research and innovation within the biomedical and biomolecular sciences”. We wish Prof. Gallagher all the best with this endeavour.

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For the past three years, BREAST-PREDICT have invited over 50 national and international speakers to showcase their cancer research at various seminars, symposiums and workshops. Over the last six months, we have held numerous events, including talks to mark World Cancer Day 2016 and a workshop on breast and prostate cancer.

In December 2015, the BREAST-PREDICT team invited Dr. Fiona Ginty: a principal scientist in the Life Sciences and Molecular Diagnostics department at GE Global Research, to present a technical seminar entitled ‘Imaging of Tumour Heterogeneity’. This was a highly informative talk, detailing the novel multiplexed immunofluorescence technology that has been developed by Dr. Ginty at GE Healthcare.

The BREAST-PREDICT team organised a successful SFI-funded workshop on ‘Clinical Decision Support Systems for Breast and Prostate Cancer’ in March 2016. This workshop, which was hosted by BREAST-PREDICT Director Prof. William Gallagher and Conway Institute PI Prof. Bill Watson, had over eighty people in attendance and 18 international and national speakers. Sessions for this event were focused on prognostic and predictive tools and included topics such as the determination of the key clinical questions, translating technology into clinical utility, novel computational & statistical approaches, and health economics and risk perception.

BREAST-PREDICT PI Prof. Joe Duffy kicked off this one and a half day event by presenting the latest research on validation of emerging cancer biomarkers; this was followed by numerous presentations and panel discussions from key researchers within the breast and prostate cancer community, such as Prof. Mitch Dowsett from Institute of Cancer Research, London who presented an overview of the clinical scene for breast cancer; Prof. Ewout Steyerberg, Erasmus MC – University Medical Centre Rotterdam, who discussed statistical methods for biomarker performance evaluation; and Prof Fraser Symmans, University of Texas MD Anderson Cancer Center who discussed making sense of multi-gene expression panels in breast cancer.

Over the next six months, BREAST-PREDICT will host numerous events. We have invited Dr. Gerard Manning, Director of Bioinformatics and Computational Biology at Genentech as a plenary speaker in September 2016 as part of the UCD Conway Festival of Research and Innovation. Prof. Nick Turner from the Institute of Cancer Research, London will also visit Dublin on 19th September 2016, and give a seminar as part of the "Steroid ‘Drivers’ and Potential ‘Putters’ in Breast Cancer" conference being organised by Prof. Leonie Young in RCSI.

Cancer Week Ireland will take place from 17th–23rd October 2016, and involves a week-long programme of activities aimed at raising public awareness of cancer in Ireland. We have a number of renowned international speakers lined up for our event including Prof. Robert Coleman from the University of Sheffield; Prof. Anne-Lise Børresen-Dale from the Institute for Cancer Research, Oslo University Hospital; and Prof. Klaus Pantel from the University Medical Centre Hamburg-Eppendorf.

On 13th April 2016 UCD hosted a patient engagement event organised by UCD Medicine Research, UCD Conway Institute, Systems Biology Ireland, and BREAST-PREDICT. Over 100 cancer survivors and their families were in attendance to participate in a round-table forum with researchers, funding bodies, cancer charities and healthcare professionals to discuss placing survivorship at the heart of the cancer research agenda. Participants were also given the opportunity to take part in laboratory tours to allow them to experience first-hand the cancer research that is ongoing in UCD.

The nationalbreastcancerresource.ie database is now live! The nationalbreastcancerresource.ie database is now live. BREAST-PREDICT principal investigators and research nurses will very shortly be sent their login details. The WP1 database team are putting in place a system of biannual updates on the first Friday of the month in January and July. Data to be uploaded to the database should be sent to Prof. Leonie Young’s group in RCSI and will be formatted and uploaded on the next scheduled day.

The database will also be used to host requests for access from groups outside of BREAST-PREDICT. Forms for this purpose are available on the website without logging in, and those PIs involved will be able to review requests by logging in and navigating appropriately. We hope that everyone finds the resource useful and welcome comments.