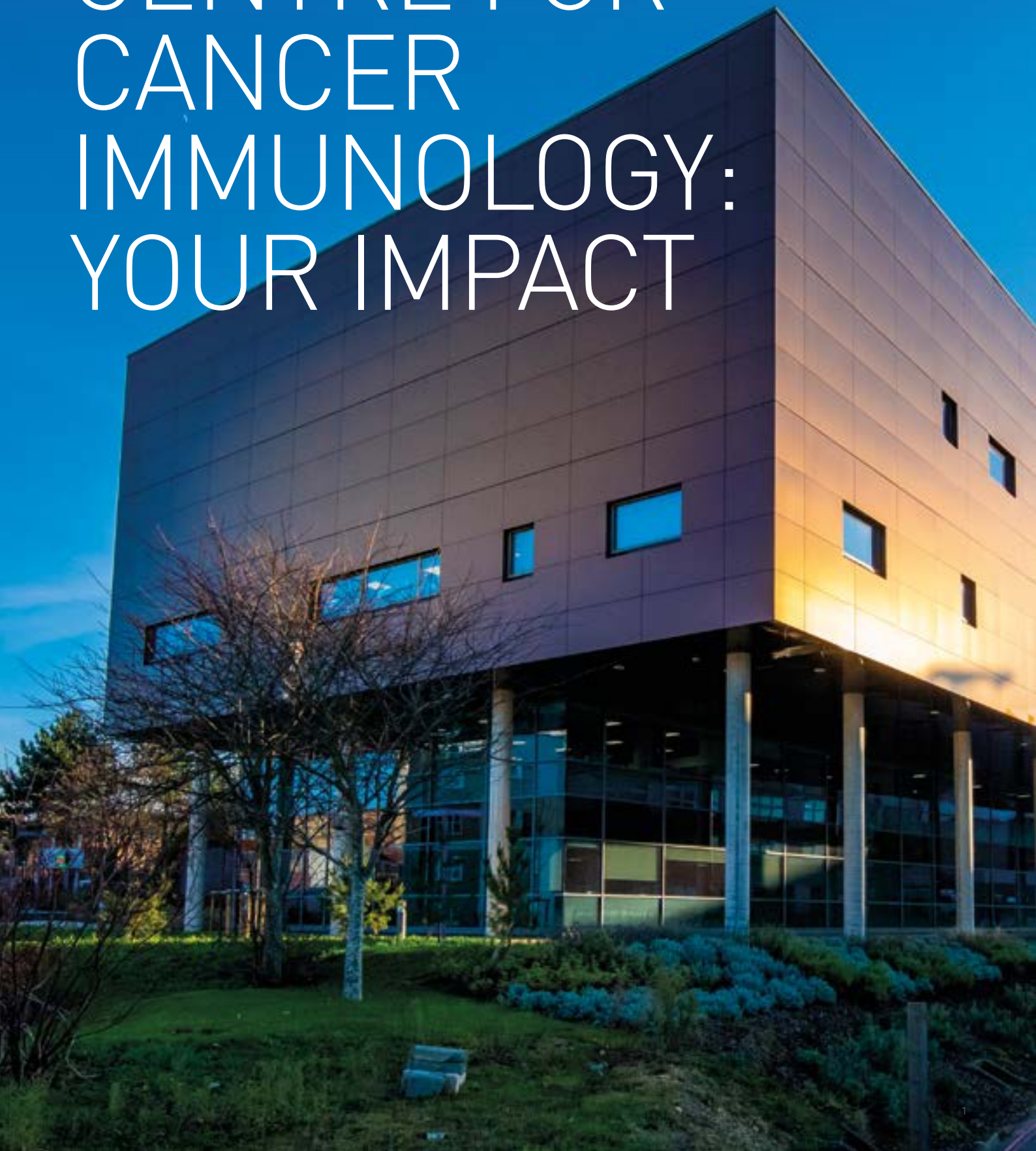


UNIVERSITY OF
Southampton

CENTRE FOR CANCER IMMUNOLOGY: YOUR IMPACT



WELCOME

At the opening of the Centre for Cancer Immunology (CCI), I made a speech outlining my vision of a world free from cancer.

Today, thanks to your incredible generosity, we are closer to making that vision a reality. This report shares with you updates on some of our research, our plans for the future, and how we continue to change lives for the better. None of this would have been possible without your support, for which we are incredibly grateful.

Cancer is one of the leading causes of death worldwide, and it is universally acknowledged that better, less destructive treatments cannot come soon enough.

Having seen the amazing work done at the Centre within its first year, I am more certain than ever that the CCI will revolutionise cancer treatment and save countless lives.

Our state-of-the-art facility is the first building in the University's history to be fully funded by philanthropy, and your donations continue to support our world-class talent pushing the boundaries of research.

Our scientists, clinicians and technical experts have created a collaborative, innovative environment where knowledge is developed and shared to the benefit of patients and wider practitioners.

Every single day we are learning and improving, and our work continues to produce astonishing results.

I am incredibly proud of what we have achieved so far but this is just the beginning of the journey.

The impact of your gift is enduring and it is with gratitude that I extend our sincere thanks. I hope when you read this report you share my pride and hope for the future.

Thank you (again!)

Professor Tim Elliott
*Director for the Centre
for Cancer Immunology*



CAMPAIGN HIGHLIGHTS

2012

July: The University is gifted £10m by an anonymous donor. It is the largest single gift in the University's history. It is announced that the donation will be used to build a cancer immunology centre.

2015

June: The Wilkinson Charitable Trust - established by Guernsey residents Jim and Peggy Wilkinson - donates £1m. The University launches a public campaign to raise £25m to build the Centre for Cancer Immunology.

August: £480,000 is awarded by the Wolfson Foundation to build immunomonitoring laboratories. The donation recognises the University's outstanding work in translating research into treatments.

November: Internationally renowned cancer immunology scientist Professor Tim Elliott is appointed as the Director of the new Centre.

2016

February: The Centre passes 75% funded thanks to £4.5m from the Solent Local Enterprise Partnership.

February: Southampton City Council awards planning permission.

June: A time capsule is buried at the Centre's building site in a ceremony featuring ex-Saints forward Matt Le Tissier. It contains a pledge reaffirming the University and University Hospital Southampton's commitment to finding a cure for cancer and a picture drawn by a clinical trial patient.

October: Major development in the construction work as the Centre's concrete frame is completed.

2017

January: £1.35m donation from alumnus James Vernon and his wife Mindy. Total fundraising reaches £20.5m.

July: Music stars Coldplay make a significant contribution. Drummer Will Champion's parents were senior academics at the University. His mother died of cancer in 2000. Total now stands at £21.6m.

October: Anonymous donor from Guernsey pledges £2m. Total raised is £23.8m. Professor Tim Elliott says: "We are within touching distance of our new Centre being a reality."

December: Fundraising passes £24m. Less than £1m is required to hit target.

2018

February: The University announces it has reached its fundraising target, six months ahead of schedule. Professor Sir Christopher Snowden, President and Vice-Chancellor of the University of Southampton, is "delighted and proud", announcing the achievement on 4 February, World Cancer Day. He says: "The next few years will see great advances in immunotherapies for cancer with the University of Southampton at the very forefront of discovery."

July: The Centre for Cancer Immunology officially opens, with celebratory events attended by donors, patients and staff. Patient Jean Bayliss says: "It was amazing to see the building, the design, the equipment, but more so to hear the views of all the staff who obviously work as a team and were delighted to see the Centre lay-out reflect progressive ways of working and conducting research."

THE CANCER IMMUNOLOGY TALENT FUND

The Centre for Cancer Immunology was made possible by the generosity and dedication of thousands of donors. To progress our important research, we've established the Cancer Immunology Talent Fund, and we've been overwhelmed by the widespread support we've already received.

The Cancer Immunology Talent Fund is crucial to the success of the Centre. It supports three aims: to launch the UK's first integrated PhD in cancer immunology, to attract world-class talent to advance our research, and to develop a new interdisciplinary innovation residency programme.

Here are examples of how the new Talent Fund is ensuring the Centre for Cancer Immunology remains at the forefront of cancer research...



The PhD student: Michaela Christodoulaki

Michaela Christodoulaki is at the beginning of a four-year research project which aims to identify cervical cancer associated ERAP1 variants and their function. The hope is this will provide the tools to identify women at high risk of developing cervical cancer so they can receive early treatment.

Michaela, who is originally from Greece, has a BSc in cancer biology and immunology from the University of Bristol and was attracted by the Centre's international reputation.

"The Centre is incredible. Every person is working towards the common goal of eliminating cancer and I am thankful for the opportunity I was given to be a part of such a brilliant team. To know that our discoveries in the laboratories will find their way into patient clinics makes all of the work so rewarding."

According to Cancer Research UK, there are 3,200 new cases of cervical cancer reported in the UK each year and rates are expected to rise by 43% by 2035.

Michaela says: "Statistics show that research on new therapeutic approaches and prognostic tools for cervical cancer is urgent. We need more research into the underlying mechanism of cervical cancer development and how we can use our body's immune system to fight it. I know that I am at the best place, at the right time, to do this vital work which I hope will help many women."

Michaela's PhD is being funded by the University of Southampton's Centre for Cancer Immunology Talent Fund alongside local medical research charities Hope for Guernsey and Wessex Medical Research. She says she is honoured by the philanthropic support that is enabling her to carry out her research.

"It is so important for people to get behind medical research, in whatever way they can. The research that is taking place at the University of Southampton, within the Centre for Cancer Immunology, will keep pushing boundaries in finding new ways to successfully treat people.

"We are part of something that is bigger than us as individuals. The Centre's work as a collective will have an impact on the lives of so many other people and it is an honour to be a part of that."

The global talent: Professors Sally Ward and Raimund Ober

Swapping the southern United States for the south coast of the UK may not sound an obvious career move, but for Professor Sally Ward the opportunity to join the Centre for Cancer Immunology was "too good to miss".

Professor Ward and her colleague Professor Raimund Ober are both world-leaders in the field of antibody-based therapeutics and joined the Centre from Texas A&M University.

Their aim was to establish an interdisciplinary laboratory to investigate the mechanism of action of immunotherapeutic antibodies and discover new ways of engineering them to be more efficient.

Professor Ober is a physicist and his expertise lies in developing new super-resolution imaging techniques to study the fate of therapeutic anti-cancer antibodies as they attack cancer cells.

Professor Ward's main area of research involves finding new ways to engineer antibodies to help them destroy cancer cells and understanding how the cancer cells respond to different types of antibodies.

Their pre-clinical research has mainly focussed on breast and prostate cancers, expanding Southampton's immunotherapy research programmes which include lung cancer, head and neck cancer, neuroblastoma and several types of blood cancer.

On being appointed, Professor Ober said: "Southampton has a remarkable reputation for taking basic scientific discoveries from the lab through to clinical practice and it is very exciting to be a part of that."

Professor Tim Elliott is equally enthusiastic about the pair's decision to join the University: "We are thrilled to welcome Sally and Raimund to Southampton. They are both world-class in their respective fields and their interdisciplinary approach fits very well with our vision to take patient-focussed cancer immunology research to a new level."

For Professor Ward, her new role at the Centre was not the only reason to celebrate. A body of work she contributed to whilst at the Medical Research Council Laboratory of Molecular Biology in Cambridge led to Sir Gregory Winter being awarded the 2018 Nobel Prize for Chemistry, and she attended the ceremony in Stockholm as a guest of Sir Gregory.

This work involved the development of 'test-tube evolution' approaches to isolate antibodies that bind to specific targets such as inflammatory molecules and tumour markers. These approaches are now widely used in biopharma to isolate antibodies of therapeutic potential and have resulted in a generation of blockbuster drugs.

The residency mathematician: Professor Jacek Brodzki

Jacek Brodzki is Professor of Pure Mathematics at the University of Southampton and the first participant on the Centre’s interdisciplinary Innovation Residency Programme.

The idea behind the residency programme is to provide an immersive experience in cancer immunology for established researchers in other disciplines across the University with a view to developing joint programmes of research.

Professor Brodzki explains why he wanted to work with the Centre:

“After twenty years of work in pure mathematics, I started research in applications of topology about six or seven years ago. Cancer immunology experiments create vast amounts of complex and multidimensional data. Topological data analysis has been created to answer this challenge.

“The Centre has a wonderfully clear vision for its mission: how to make cancer visible to the immune system. Despite its simplicity, it’s very difficult to translate this vision into practical solutions. I find both the vision and the challenge of the problems it’s attempting to overcome very attractive.

“It is crucial for me to be able to talk to the experts who created the data to understand the underlying problems and motivations for the experiments. The residency programme offers direct access to the cutting-edge experiments and shortens considerably the learning cycle.

“From my initial work carried out during my residency, I plan to set up a new research programme in applications of topology specific to cancer immunology. I hope that the initial results obtained during my placement will be solid enough to secure funding for follow-on projects.

“The funding available through the national science and medicine foundations is not sufficient to fulfil the urgent need for new research. It is wonderful that there are individuals and companies willing to support this work, and I hope this will increase. Philanthropy is typically much more flexible than the established funding streams and can create significant results very quickly.

“I have been privileged to work with great scientists at Southampton and elsewhere from whom I learned a great deal. It is very exciting that, thanks to significant progress in the experimental technologies and our understanding of the underlying processes, the interactions between biology and mathematics are growing and will keep growing significantly over the coming years. It’s a wonderful place to be.”



2x

the increase in clinical trial capacity since the Centre opened



160

staff members located in the building



14,250

square foot of lab space



Over

100

designers, consultants, and engineers



3 years to build



2 years in the planning

3,799

miles run in the ABP Marathon in support of Cancer Immunology



Over **300**

new jobs created during the construction and since the opening



160,000

man hours of construction

145

people ran for the campaign in the ABP Marathon



4776

separate donors gave gifts to the campaign



The **UK's first**

centre dedicated to cancer immunology research

225

people toured the Centre's labs



Top community fundraising activities:
- Cake selling
- Marathon running
- #WearingWhite



Over

1.5m

people reached on Facebook on the day of our £25m announcement

More than

90%

of our patients who have been treated with antibody immunotherapy and survived more than two years remain cancer free

NEUROBLASTOMA TRIAL OFFERS HOPE TO CHILDREN WITH CANCER

Dr Juliet Gray, a specialist in paediatric oncology, is leading a groundbreaking transatlantic trial that is hoped will improve survival rates of children with a common form of cancer.

Neuroblastoma originates in developing nerve cells and there are around 100 new diagnoses each year in the UK. It usually develops as a tumour in the abdomen or chest of children under five, and in about two-thirds of cases the disease is advanced by the time of diagnosis.

Conventionally, neuroblastoma treatment involves intensive chemotherapy, surgery, a stem cell transplant and radiotherapy. Treatment lasts for a year, during which children spend significant time in hospital. Side effects can include deafness and poor kidney function.

With traditional therapies, prognosis for high-risk neuroblastoma is poor, with only 30-40% of children surviving in the long-term. And if the initial treatment fails, there are few alternatives.

Dr Gray's trial, which will take three years, combines a form of targeted radiotherapy with two different antibody therapies to boost a child's own immune system to kill off the disease.

In October 2018, the trial made the national news as eight-year-old Luke Bell from Darlington became the first of twelve children to take part. He visits the Centre twice a month and will do for six months.

Without the pioneering treatment taking place at the Centre, Luke's family and many others would have had no option but to look abroad for treatment.

Dr Gray hopes her work will one day lead to a cure for neuroblastoma:

"Parents of children with neuroblastoma understand that even if the tumour shrinks and responds well to initial treatment, there is a very high chance that there will be tumour cells left behind which will subsequently result in relapse.

"Immunotherapy trials offer the hope of eliminating any residual cells and reducing the chances of the disease coming back.

"We're as optimistic as we can be from the clinical work we've done that there's a good scientific reason these treatments will work well together. These are children for whom there aren't any curative treatments left. The established treatments for neuroblastoma haven't worked. This is something new to offer them and give them hope. It's really exciting to be in a position where we can do that."



PIONEERING SOUTHAMPTON IMMUNOLOGIST AWARDED INTERNATIONAL MEDAL

Professor Freda Stevenson has recently been announced as a winner of the 2018 Henry M. Stratton Medal by The American Society of Hematology (ASH) for her influential work in haematology research.

Professor Stevenson - who is based at the Centre for Cancer Immunology and has worked in Southampton for over 40 years - led groundbreaking research into understanding how to engage the immune system in the fight against lymphoma. Freda and her husband, George, founded the Immunochemistry labs in Southampton in 1975 and went on to build the world-leading team into the powerhouse it is today.

ASH President Alexis Thompson said Professor Stevenson's discoveries "have exponentially improved the specificity with which we can diagnose and care for our patients with haematologic malignancies".

"It is a pleasure to be recognized by the ASH community," said Professor Stevenson. "Research in basic science continues to underpin clinical progress, and I am proud to have contributed to this interface in haematology."

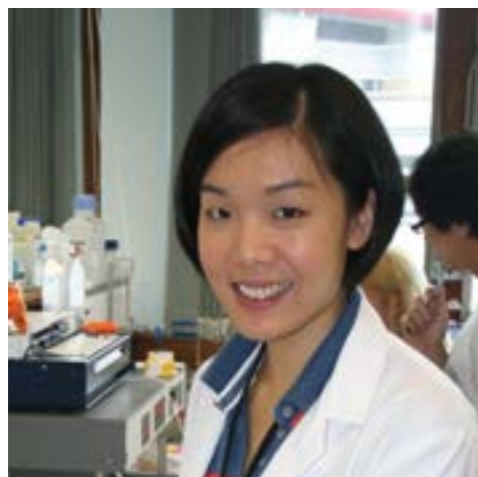
In the 1970s, Professor Stevenson was among the first scientists to publish work describing the concept that the immune system could be steered towards fighting cancer.

The Henry M. Stratton Medal is not the first time she has been recognised by her peers. The publication of her study into the biology of B-cell malignancies earned Professor Stevenson the Rai-Binet Medal from the International Workshop on Chronic Lymphocytic Leukaemia and has been cited over 1800 times.

Professor Stevenson also designed gene-based vaccines that work against tumor antigens to help provide long-term protection against cancer relapse. For this work she was presented with the European Hematology Association's Jean Bernard Lifetime Achievement Award.

In both cases she was the first woman, the first non-clinical scientist and the first UK citizen to win.





CANCER SCIENTIST SECURES £1.65M RESEARCH BOOST

Associate Professor Dr Sean Lim, a member of the Centre's antibody and vaccine group, has been awarded £1.65m to further her immunology research.

Dr Lim, who also recently won the British Association for Cancer Research's Roger Griffin Prize for Cancer Drug Discovery, investigates ways antibodies can be designed and engineered to recognise specific proteins on the surface of cancer cells. This allows researchers to use them as potential new treatments.

The funding, from Cancer Research UK, comes as an Advanced Clinician Scientist Fellowship.

Dr Lim's work found that a specific combination of antibodies – anti-CD27 and anti-CD20 – were highly effective in curing mice with lymphoma. The combination is now being tested in patients as part of the RiVa clinical trial.

Dr Lim said: "This project will expand on the RiVa trial to look at a wider variety of antibodies which could have similar effects in stimulating immune cells. We will also look further than just lymphoma, branching into solid tumour cancers, including breast and colon cancers."

Dr Lim also hopes to use the money to develop CITE-seq technology, which is capable of simultaneous measurement of RNA and proteins from single cells: "This will enable us to scrutinise the effects of the antibodies on the tumour and surrounding immune system in tremendous detail. The main aim is to get better, broader information about the tumour microenvironment and the number of immune cells present within it, to see how the immune system is responding to combination antibody treatments. This knowledge is imperative for the success of the next antibody trials we design."

The research will be carried out at the Centre for Cancer Immunology and will involve national and international collaborators, including the New York Genome Centre.





“Abi’s case was not one that we see regularly so we did not know what outcome to expect and to prepare her for. Through years of research and clinical trials at Southampton we know the amazing power that immunotherapy can have, but to see the reduction in Abi’s tumours happen so quickly after treatment started was truly remarkable. Abi’s story is one of great hope for our patients and shows how important clinical trials and medical research is. It is a clear example of the lifesaving potential immunotherapy has and we are privileged to be part of this research field.”

Professor Christian Ottensmeier
Professor in Experimental Cancer Medicine

THE PATIENT’S STORY

Abi Richards was only 27 when she was given two weeks to live.

“Immunotherapy literally saved my life”

Abi Richards was only 27 when she was given two weeks to live. In August 2016 Abi was feeling ill, so travelled to Winchester Hospital. She was tested for appendicitis and gallstones but a routine CT revealed 13 tumours on her liver and one on her lung. One of the tumours was 10cm and her liver was failing.

She was referred to University Hospital Southampton - a specialist centre for melanoma, an advanced form of skin cancer - where the doctors recommended cancer immunotherapy.

“I had nothing to lose and immediately agreed to immunotherapy,” says Abi. But there was the risk if the treatment didn’t work, it could speed up the progression of the disease.

Back in 2009, Abi had a successful operation to remove a malignant mole and surrounding tissue on her back. So in 2016, when the CT scan at Winchester revealed the cancer had returned, it was a huge shock to her and her husband, Ross.

“It honestly felt like we were in some horrible TV drama, like we were looking in from the outside and we just couldn’t believe this was happening.”

Ten days later, Abi was in excruciating pain and waiting for an appointment with the Oncology team at Southampton Hospital when she was told by doctors they believed she only had days to live.

“I didn’t cry, I didn’t know what to do. I just needed a plan”

“At this point, I don’t even know if I was scared. I didn’t have to deal with the fallout if things went horribly wrong. My family did. My friends did. I couldn’t bear the thought of leaving them all behind to deal with this. All I could think about was our magical wedding day just a couple of years before, all the hope for a happy future, a long marriage, a family of our own.”

Under the care of the University of Southampton’s Christian Ottensmeier, Professor in Experimental Cancer Medicine, Abi was put on a combination of immunotherapy drugs Ipilimumab and Nivolumab, both only recently licensed and made available on the NHS for the treatment of melanoma.

Abi recalls: “When you have cancer, straight away you think chemotherapy. You think you will lose your hair and become really ill. But with immunotherapy, all I had was a rash.”

After a two-week stay, Abi was discharged.

Astonishing results

From August 2016, Abi was given treatment for one day every three weeks. Amazingly she did not experience any side effects. After the second course, Abi had another scan. “They told me, excitedly, that the tumours had all got smaller. The immunotherapy was working.”

In January 2017, Abi had a detailed PET scan. She hoped to be told her condition had stabilised, the news was even better.

“The doctor came in with the results. He told me there were no active cancer cells. Effectively the cancer cells had all ‘gone cold’, just leaving scar tissue. I didn’t even know this could happen, and I think the doctors were just as shocked!”

Abi and Ross both walked out in tears. “I spent the whole journey home phoning everyone telling them the good news. It was an amazing feeling!”

In full remission, Abi is no longer receiving treatment but attends follow-up appointments for blood tests and scans, which will become less frequent.

Abi is also delighted to say that she’s shortly due to give birth to her first child.

“All I could think about was our magical wedding day just a couple of years before, all the hope for a happy future, a long marriage, a family of our own.”



THE DONOR'S STORY

Ian Goddard, 67, is a retired captain in the Royal Navy and worked for NATO. He is married with two children.

“I read about the campaign to fund the new research centre and resolved to do what I could to support it.”

Why did you want to support the Centre for Cancer Immunology?

I was diagnosed with Stage 4 Metastatic Melanoma in December 2016. At the time I was a patient of Queen Alexandra's Hospital in Portsmouth and my oncologist told me about immunotherapy treatment being trialled in Southampton. She also described the treatment options she had available at Queen Alexandra. I spent some time discovering what I could about immunotherapy and this persuaded me that my best chance lay in commencing immunotherapy treatment as soon as possible.

I was immediately referred to the Melanoma Immunotherapy team. Within a week I was sitting down in Dr Wheeler's office discussing my way forward. It was during my research on immunotherapy that I read about the campaign to fund the new research centre and resolved to do what I could to support it.

Tell us about your experience of immunotherapy

I spent a lot of time in hospital from March 2017 to June 2017 - 36 days over 8 separate admissions - and I met a number of people receiving the same treatment as me. We were all terribly impressed with the care we received and incredibly grateful for the attention and dedication of all involved.

I had already decided to help fund the development of the Centre and I finally got round to doing something about it in the autumn. By then I had recovered from the treatment and the side effects. I have been very fortunate. I have had three clear scans over the last nine months and am back to living a normal life. Obviously, I very much hope that this continues.

Was there a particular person or story that inspired your support?

The key individuals were Professor Ottensmeier and Dr Wheeler. During my treatment, we had a number of conversations about the treatment and I formed the opinion that their work would likely be a game-changer in cancer treatment and every penny spent on furthering their research would be very well spent.

What are your hopes for the future of the Centre?

I have benefited so significantly from the Centre's work and I hope my donation will benefit others who find themselves in the same situation. Having spoken with Professor Ottensmeier and Dr Wheeler, I have some inkling of their hopes and aspirations for the future treatment of cancer. There are exciting possibilities just over the horizon and it is vital that their work can continue without being held back through lack of funding.

THANK YOU FROM THE DEAN OF MEDICINE

The completion of the campaign to raise £25m towards the Centre for Cancer Immunology was not only a highlight of the past year, but also a momentous achievement in the University of Southampton's fundraising history.

This campaign enabled the creation of a world-class, fit-for-purpose research facility that will change the lives of cancer patients for generations to come.

The building is constructed, the scientists are now in situ, and the work towards curing cancer has significantly accelerated – this is all thanks to you and your support. I hope this report goes some way to illustrating to you the impact of your generosity. Your involvement has been vital.

As the University's new Dean of Medicine, I am fascinated to oversee future developments and breakthroughs in the field of cancer immunology, as well as the wider application of immunology in other disease areas. Cancer immunology is leading the way, but the technology and knowledge is applicable to many other processes, and we are applying similar approaches now to diseases beyond cancer.

We are at an exciting point in time for the University and the Faculty of Medicine. As we continue to teach and research – preparing the next generation to tackle tomorrow's global challenges – we are also working closely with experts from across the University. We are exploring how our environment influences our immunity and our health, and how we can more accurately predict and prevent

serious diseases including cancer. With this interdisciplinary approach, we are able to make greater progress in areas such as ageing, musculoskeletal diseases, and antimicrobial resistance.

Challenges like these require the efforts of academics and researchers, and also the contributions of donors – and that is why we are so grateful to you for enabling us to build the Centre for Cancer Immunology. I feel confident that we will continue to reap the rewards of your generous support, and truly see the benefits that immunology can bring.

Thank you.

Professor Diana Eccles
Dean of Medicine





Find out more

www.southampton.ac.uk/youreit



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