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Walter+Eliza Hall
Institute of Medical Research

DISCOVERIES FOR HUMANITY

ANNUAL REPORT 2019

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We acknowledge the traditional owners and custodians of the land on which our campuses are located, the Wurundjeri people of the Kulin nation, and pay our respects to their elders past and present.

About the Institute

The Walter and Eliza Hall Institute is one of Australia's leading biomedical research organisations, with a strong national and international reputation for performing highly influential basic and translational research.

The Institute was founded in 1915 with financial support from a trust established by Eliza Hall, following the death of her husband Walter. The vision was for an institute that 'will be the birthplace of discoveries rendering signal service to mankind in the prevention and removal of disease and the mitigation of suffering'.

Today, with more than 1100 staff and students, the Institute is addressing some of the major health challenges of our time, with a focus on cancer, infection, inflammation, immune disorders, development and ageing.

We are at the forefront of research innovation, with a strong commitment to excellence and investment in research computing, advanced technologies and developing new medicines and diagnostics. Our researchers are strongly supported by Professional Services teams.

This Institute is committed to delivering long-term improvements in treating and diagnosing diseases, with many national and international clinical trials underway based on research undertaken at the Institute.

Our main laboratories are located in the world-renowned Parkville precinct, a vibrant and collaborative life science research, education and healthcare hub.

The Institute offers postgraduate training as the Department of Medical Biology of the University of Melbourne, and is affiliated with the University of Melbourne and The Royal Melbourne Hospital.

Our mission

Mastery of disease through discovery

Our vision

To be an innovative medical research institute that enriches society through discovery and education and improves health outcomes through translation

Our values

- Pursuit of excellence
- Integrity and mutual respect
- Collaboration and teamwork
- Creativity
- Accountability
- Contribution to society

President's report

It is a pleasure to be able to report to you on the past year at the Institute, having taken on the role of Board President in May 2019.

As the Institute's first female Board President, I hope my appointment will influence the progression of more women into leadership positions within the Institute and the wider scientific community. It is our duty to identify and remove barriers that may inhibit our female scientists from progressing in their careers, and I am proud of the work already underway at the Institute towards gender equality.

Positive impact

My warm wishes and thanks go to retiring Board President Mr Chris Thomas AM who served the Institute for nearly 20 years, including six years as President. It has been a privilege to work with Chris since I joined the Board in 2013, and his dedication and contributions will be missed by us all.

As President, Chris was an astute leader and oversaw a number of transformative projects at the Institute. In recognition of his significant impact, the Institute created the Chris and Cheryl Thomas Leadership Award, providing development opportunities for our emerging leaders.

I would also like to thank Dr Graham Mitchell AO who retired from the Board last May, after more than more than a decade of service. As well as being a highly respected scientist and alumnus, Graham was instrumental in building a commercial mindset at the Institute, which led to the commercialisation of venetoclax and set the course for new medicines currently in development.

Associate Professor Pippa Connolly joined the Board in April. A senior executive building engineer with experience in delivering large multidisciplinary infrastructure projects, including our own building, she also served as non-executive director at The Royal Melbourne Hospital, the State Board of Arup and the National Association of Women in Construction.

As we look to the future, the Board reaffirms its commitment to good governance, with renewed focus on leadership development, succession planning and sustainability.

Vision for the future

The Board is committed to ensuring the Institute continues to deliver on its mission to produce influential basic research and translate this into improved disease prevention, diagnosis and treatment. Our *Strategic Plan 2019-2023* emphasises our core values of collaboration and innovation, and details how we will maintain our international standing as a creative, ambitious and nimble research organisation and workplace in an increasingly complex and rapidly changing world (p6).

We were grateful to receive generous investments to pursue important new initiatives this year. The National Drug Discovery Centre (p8), which opened in early 2020, is an exciting 'Australian first' that will enable researchers from across Australia to fast-track their research discoveries to life-saving new medicines for patients. We thank the Australian and Victorian governments for their substantial investments in helping to establish the centre, along with philanthropic donations from our supporters. We are also proud to have invested $32 million of the Institute's funds, made possible through our monetisation of venetoclax royalties. Together, this funding will make this wonderful facility accessible to Australian researchers in a highly subsidised way.

"The Board is committed to ensuring the Institute continues to deliver on its mission to produce influential basic research and translate this into improved disease prevention, diagnosis and treatment."

Our thanks also to the Colonial Foundation, who invested $15 million with us to establish the Colonial Foundation Healthy Ageing Centre, with the goal of developing an early diagnostic test for dementia (p27). It is one of the largest philanthropic donations made to the Institute in our history. We thank Colonial Foundation for their support of this visionary research, a joint initiative between the Institute and The Royal Melbourne Hospital, and look forward to delivering exciting news on this program in the future.

As always, we are indebted to the generous supporters and bequestors, who contributed almost $19 million to research at the Institute this year. This funding is critical to many research programs at the Institute, but is especially important for supporting our early-career researchers and hard-to-fund research and technologies.

Centenary Campaign

The Institute has always been a magnet for the brightest young scientific talent. For early-career researchers, no matter how talented, their comparative lack of track record to their senior counterparts hinders their ability to secure vital government funding. In 2015, we launched the Centenary Campaign – a five-year campaign to secure funding to support our early-career researchers.

"With the vital help of our Centenary donors, our brilliant young leaders – our Centenary Fellows – have been able to take their promising research to the next level."

With the vital help of our Centenary donors, our brilliant young leaders – our Centenary Fellows – have

been able to take their promising research to the next level. Together, our Centenary donors have pledged a remarkable $46.1 million, enabling the Institute to advance knowledge in diseases including leukaemia, coeliac disease, pancreatic cancer, multiple sclerosis, rare cancers and many others. One measure of success is the number of impactful research publications: to date, the cohort of Centenary Fellows has collectively published 339 research papers, of which one in five were in high-ranking journals. Many of them you will see in the pages of this report.

Facing a global threat

As I write this, I can't overlook the unprecedented pandemic that we are facing, and its global health and economic consequences. It has been heartening to see how the Institute staff and students have responded – fast-tracking programs to develop and trial new diagnostics and treatments for COVID-19, volunteering their time and expertise to healthcare efforts in Melbourne, and supporting each other and their communities in this time of need.

For our part, the Board and executive team are focused on: first, ensuring the health, safety and wellbeing of all the staff and students at the Institute; second, contributing to the battle against the virus and; finally, ensuring that the Institute weathers this storm and emerges stronger than ever to continue its vital research. To be successful in all three endeavours will, as always, require your support.

My warmest wishes to you and your families at this difficult time. We hope that you stay safe and well.

Mrs Jane Hemstritch
President, Walter and Eliza Hall Institute of Medical Research

Director's report

A director's report usually focusses solely on the previous year's work; however, the start of 2020 – when we are in the midst of the COVID-19 pandemic – is anything but usual.

Every day I am reminded in some way of the Institute's role in improving our community's health over the past 105 years. We have investigated infectious diseases sweeping our community such as influenza and polio, and combatted cancer and immune disorders. In this work we have changed how we understand our bodies in health and disease. Breakthrough discoveries made here at the Institute in the last century underpin how the entire world is basing its response to the current pandemic.

"As always, I have been inspired by the commitment of our researchers and their willingness to collaborate, both internally and externally. We are truly brighter together."

Here at the Institute, we are leading on some projects and collaborating with a range of research partners on other projects all aimed at mitigating the potentially devastating impact of the COVID-19 pandemic. This includes organising clinical trials of existing medicines, improving diagnostics, investigating the virus and working on new treatments. As always, I have been inspired by the commitment of our researchers and their willingness to collaborate, both internally and externally. We are truly brighter together.

A landmark year

2019 was an important year for the Institute. As you will read about in this publication, we established our new scientific structure which provides the leadership and oversight for our *2019-2023 Strategic Plan*.

Our researchers have thrived under our new research themes, structured around cancer, immune and infectious diseases, healthy development and ageing, advanced technologies and new medicines, and computational biology. Collaborations within the Institute have been strengthened and extended, and we have established new links with other partner organisations as well as maintaining our strong connections with long-term partners, in particular The Royal Melbourne Hospital and the University of Melbourne.

In 1915, the University of Melbourne and The Royal Melbourne Hospital, in collaboration with The Walter and Eliza Hall Trust established this Institute. More than 100 years later we are delighted to establish the Colonial Foundation Healthy Ageing Centre (p27) in collaboration with The Royal Melbourne Hospital and the Colonial Foundation; our research continues to be supported by The Walter and Eliza Hall Trust; and we continue to work closely with the University of Melbourne, with our stunningly talented cohort of research students who call WEHI home enrolled through this great university.

As you will read, 2019 has also been an exceptionally exciting year for discoveries. Making these discoveries has happened because of your support. We are privileged to have equally loyal and generous support from our alumni, Board, Victorian and Australian community and their elected representatives. Many of our partners have long-term relationships with us – none more so than the Walter and Eliza Hall Trust. We also receive many donations from staff and students – some large, some small and regular. That the people working in our research laboratories and professional services also want to support the Institute financially is truly inspiring.

Many of our staff and students were also recognised with local, national and international awards for their work. Some highlights include the honouring of Jacques Miller, along with Max Cooper of Emory University, with The Albert Lasker Award for Basic Medical Research (p7); recognition of the translational team working on venetoclax through the Prime Minister's Prize for Innovation (p31) and Somya Mehra and Narelle Keating winning prestigious Fulbright Scholarships to study in the US.

Delivering new medicines to our community

This year we were thrilled to announce establishment of the National Drug Discovery Centre (NDDC, p8). This collaborative facility, based at the Institute, offers Australian researchers the opportunity to build on fundamental research discoveries by accessing high-throughput screening for new medicines, a critical and often limiting step towards clinical translation. It is wonderful that funds from the Medical Research Future Fund have also been committed to subsidise access to the NDDC for many Australian researchers. I am looking forward to updating you on progress of NDDC projects in the coming years.

"I hope you are as excited as I am about the role medical research plays in our community."

2019 was also a landmark year for the drug venetoclax (p10), the development of which was underpinned by discoveries made at the Institute. Venetoclax has now been listed on the Australian Pharmaceutical Benefits Scheme for certain forms of blood cancer, meaning that the cost of this medicine is subsidised for Australian patients – an important step in ensuring all Australians who need venetoclax can continue to access it.

Honouring our colleagues

I would like to offer my heartfelt thanks to our retired Board President Mr Chris Thomas AM. It has been a privilege to work alongside Chris on many aspects of the Institute's governance and I have valued his wise counsel and strategic insights. I would also like to formally

welcome our new Board President Jane Hemstritch, who has been a highly valued contributor to the Board since 2013.

In 2019 six members of our faculty announced their retirement: Professor Suzanne Cory, a renowned cancer researcher and former Institute director; Professor Jerry Adams, who also made enormous contributions to cancer research; Professor Nick Nicola AO, an expert in the field of cell signalling and co-discoverer of G-CSF which has been used to help tens of millions of cancer patients complete their chemotherapy; Professor Lynn Corcoran and Professor Andrew Lew, who both made significant contributions to immunology; and Associate Professor Ian Street, a leader in high-throughput screening. We wish these colleagues well, thank them for their immense contributions to the Institute and to science more broadly and look forward to their continued connection to the Institute.

Sadly in 2019 we also lost two former colleagues. Dr Margo Honeyman was a respected colleague and beloved friend to many and will be remembered for her important contributions to diabetes research.

Our thoughts continue to be with Margo's husband and long-time WEHI researcher, Professor Len Harrison, and their family. Dr John Schrader was an important contributor to our research into colony stimulating factors in the 1970s and 80s, subsequently being recruited to an important research leadership role in Canada. Again, our thoughts are with John's wife Sa, an alumna of the Institute, and their family. Vale Margo and John.

After you read this Annual Report's reflections on 2019, I hope you are as excited as I am about the role medical research plays in our community. Thank you on behalf of all of our staff and students for your ongoing support.

Professor Doug Hilton AO
Director, Walter and Eliza Hall Institute of Medical Research

Strategic plan 2019-2023

The Institute launched a reinvigorated strategic direction at the beginning of 2019 to support our commitment to improving the lives of those suffering from disease.

Collaboration, innovation and adaptability will be as important to the Institute in the coming years as they have been in the past. These foundations are enabling us to meet the demands of 21st century health challenges and opportunities.

Ambitious new era

Over the past year, we have begun implementing a strategic plan that will see the Institute continue its leadership in basic and translational research in a complex and changing world. Against a highly competitive research landscape, it is essential that we build on our current position to strengthen and enrich our research. Our *Strategic Plan 2019-2023* sets out our strategy for thriving in this new era and meeting the current and emerging health challenges of our time. The strategy will ensure we have the critical mass to undertake ambitious discovery research and effectively take our discoveries to the clinic to improve health.

"Our purpose as a leading biomedical institution is to undertake ambitious and impactful research and to translate this into improved clinical outcomes for patients."

The plan recognises that our people are our greatest asset and the cornerstone of our success. We will continue to foster our staff and students from a range of diverse backgrounds and develop programs to create a vibrant and inclusive workplace that attracts, develops, and retains the best people by providing an environment in which all staff and students have the opportunity to thrive. We are also building on our expertise in medical research training and the revolution taking place in the education sector to establish ourselves as a leading educator of medical researchers.

Commitment to collaboration

We have continued to build and sustain strong partnerships with universities, research institutes, hospitals and industry, both nationally and internationally, to enable us to address challenging research questions. In addition to external collaboration opportunities, making discoveries requires a high degree of collaboration between our research and professional services staff.

Institute director Professor Doug Hilton said that embracing the Institute's spirit of collaboration was central to delivery of the strategic plan.

"Multidisciplinary collaboration has been a longstanding aspect of our culture and will continue to be the foundation of our work," Professor Hilton said.

"Our purpose as a leading biomedical institution is to undertake ambitious and impactful research and to translate this into improved clinical outcomes for patients. Our researchers are working wholeheartedly, collaboratively and creatively across the Institute and our thriving Melbourne Biomedical Precinct; as well as with teams nationally and internationally to resolve the pressing biomedical questions of our day," he said.

The Institute is organised around five research themes

- Cancer Research and Treatments
- Infection, Inflammation and Immunity
- Healthy Development and Ageing
- New Medicines and Advanced Technologies
- Computational Biology

The Institute's strategic goals are

1. **Knowledge and health**
   Focus and collaboration to better understand the biomedical world
2. **Attract, develop, flourish**
   Strengthen our distinctive environment where staff and students thrive
3. **Catalyse great science**
   Deliver quality services so researchers can focus on their science
4. **Engagement and advocacy**
   Position the medical research sector for long-term success

Professor Jacques Miller

Professor Jacques Miller receives Lasker Award

Walter and Eliza Hall Institute Emeritus Professor Jacques Miller AC was joint recipient of the 2019 Albert Lasker Basic Medical Research Award, with Professor Max Cooper of Emory University, US. The Lasker is one of the highest honours in medical research.

They received the award for identifying immune cells called T and B cells, which have critical roles in our immune system.

"Working separately, both Max Cooper's and my laboratory simultaneously identified T cells, which are produced in the thymus, and B cells, which mature in the bone marrow. We then showed that these two cell types play different, but equally important roles: T cells stimulate B cells to produce antibodies which can protect against infection," Professor Miller said.

Distinguishing T and B cells was truly groundbreaking. The impact of this discovery on modern medicine is immense, and underpins many important innovations including vaccine development, organ transplants, identifying and treating autoimmune diseases and immunotherapy to treat cancer.

Congratulations to Professor Miller on being recognised for his scientific achievement – just one highlight from his impressive career.

Australian-first drug discovery centre established

The Institute joins the Australian and Victorian governments in investing in bringing new medicines to patients sooner.

A critical challenge for medical researchers is taking exciting laboratory-based discoveries and translating them into drugs that help people in the community.

Many discoveries stall at the early drug-discovery stage – the so-called 'valley of death'. This is, in part, due to the cost and lack of access to facilities and technology for early-stage drug discovery, particularly in Australia.

The National Drug Discovery Centre (NDDC) will give medical researchers from across Australia access to the latest in advanced robotic ultra-high throughput screening, and the opportunity to progress their biomedical discoveries into life-saving treatments.

Generous investments

In 2019, the Australian Government committed $25 million in funding to the project, and the Victorian Government committed $18 million in funding. This support builds on the Institute's own $32.1 million investment in the centre, made possible by the partial sale of royalties from anti-cancer drug venetoclax, as well as previous Victorian Government support and generous donations from AWM Electrical, Mr Mike Fitzpatrick AO and Ms Helen Sykes.

Institute director Professor Doug Hilton said the translation of world-class Australian research had been hampered by a lack of capacity for drug development.

"The Institute is proud to have led the establishment of the NDDC, a centre that will fill a vital gap in Australia's drug discovery pipeline."

"The Institute is proud to have led the establishment of the NDDC, a centre that will fill a vital gap in Australia's drug discovery pipeline. The centre will enable our colleagues from Australian research institutes, universities and small-to-medium sized enterprises to advance their research beyond the bench, providing them with world-class facilities and staff as they fast-track their drug discovery journeys," he said.

The centre will officially open in 2020.

Above: Acting head of screening Dr Kym Lowes in the National Drug Discovery Centre.

The future of cancer

A $3.5 million grant is arming Institute scientists to conquer the biggest challenges in cancer today.

From genetic profiling to 'precision' medicine, there has been a transformation in cancer therapy and patient prognosis in the past few decades, in some cases extending lives by years or even decades.

However, even as new and promising therapies are approved, clinicians and researchers know that there will inevitably be patients whose cancers do not respond to therapies, or whose tumours quickly become resistant to the new treatment.

A complex challenge

In November 2019, Institute researchers secured a $3.5 million investment from the Australian Cancer Research Foundation (ACRF) to establish the ACRF Program for Resolving Cancer Complexity and Therapeutic Resistance, led by Professors Jane Visvader, Andrew Roberts and Clare Scott.

> *"We are now turning our attention to questioning why cancers are so complex and diverse, how they are influenced by their microenvironment, and what drives them to become resistant to therapy."*

The program will fund the purchase of cutting-edge tools and bring together 19 Institute cancer biologists, clinicians, bioinformaticians, computational biologists and technology experts in a bid to improve cancer care and survival. The multidisciplinary team are accomplished leaders in blood, breast, gastrointestinal, lung, ovarian, pancreatic and skin cancers.

Professor Warren Alexander, joint leader of the Cancer Research and Treatments theme, said cancer diversity had a significant impact on how cancers develop and respond to therapies.

"The complexity and diversity of cancers at a single-cell level, and the cells that make up the environment around a tumour, have a profound effect on treatment response. It is often difficult to predict how – or if – a patient will respond to therapy, or whether they will relapse after treatment," Professor Alexander said.

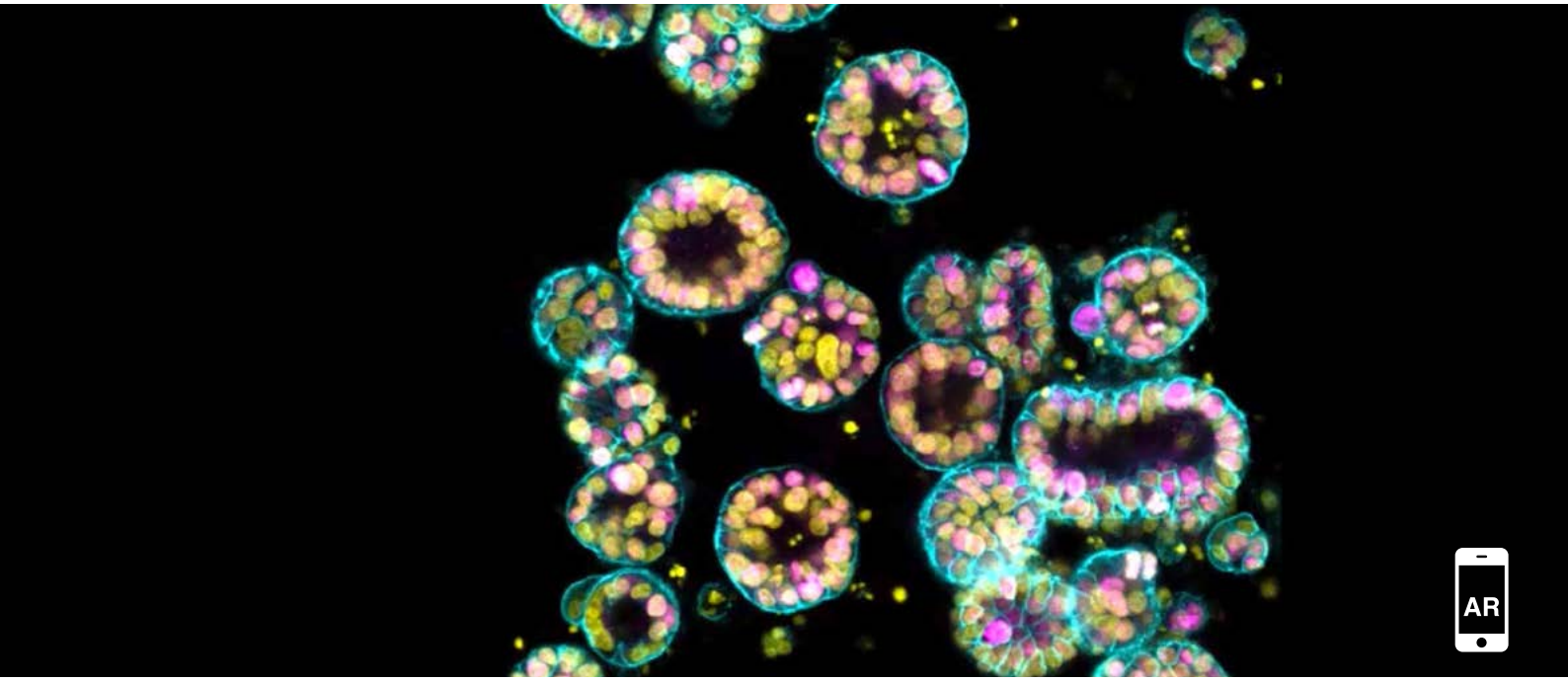
Making a real impact

The ACRF investment will fund a suite of new 'single-cell' technologies that provide capabilities not previously possible, said Professor Scott.

"We are now turning our attention to questioning why cancers are so complex and diverse, how they are influenced by their microenvironment, and what drives them to become resistant to therapy. Our goal is to acquire a deep understanding of how cancers develop at a single-cell level. This will lead to breakthroughs in how we personalise cancer therapy that will have a real impact for patients in the future, improving treatment response and overcoming treatment resistance," she said.

Below: Observing how pancreatic cancer cells (pictured) grow will enable us to better understand how they become so aggressive, and help design new therapies that could one day treat or prevent pancreatic cancer.

Image: Now you see me, now you don't, *Art of Science 2019, Ronnie Ren Jie Low.*



Anti-cancer treatment venetoclax listed on Australian PBS

The listing highlights a remarkable medical research success story.

Venetoclax – marketed as VENCLEXTA – is the first of a new class of medicines to become routinely available for clinical use in chronic lymphocytic leukaemia (CLL). Venetoclax is based on a landmark discovery made at the Institute in the late 1980s, and is currently being accessed by thousands of patients in Australia and around the world.

"The PBS listing of this drug was a proud day for the many medical researchers who came together in the hope of improving the survivorship of patients with CLL."

From 1 March 2019, venetoclax was made available through the Australian Pharmaceutical Benefits Scheme (PBS). VENCLEXTA plus rituximab was approved as a targeted, fixed duration combination therapy for treatment of patients with CLL who have received at least one prior therapy.

Australian success story

Institute director Professor Doug Hilton said the PBS listing highlighted a remarkable medical research success story, underpinned by three decades of scientific resolve, entrepreneurial drive and successful collaboration.

"Institute researchers, together with collaborators from The Royal Melbourne Hospital, Peter MacCallum Cancer Centre, and the pharmaceutical companies AbbVie and Genentech, have worked together to take the initial BCL-2 discovery right through to the development of a life-saving medicine," Professor Hilton said.

"The PBS listing of this drug was a proud day for the many medical researchers who came together in the hope of improving the survivorship of patients with CLL."

The power of medical research

Cancer survivor Deborah Sims said the announcement marked just how important it was for patients to access available treatments.

"In 2015, I was declared terminally ill. Thanks to the seminal discovery made at the Institute all those years ago and to the eventual development of the drug, I was able to get onto an early trial. I can truly say I have experienced the power of medical research," Ms Sims said.

"Having access to funded treatment is crucial for people on a cancer journey. This is wonderful news for patients in Australia who will now have access to another option for treatment."

A triumph of science and translation

Professor Andrew Roberts, Institute cancer theme leader, said the listing of VENCLEXTA was testimony to the effectiveness of Australian medical innovation.

"New medicines don't happen by accident. In the case of this drug, Australian scientists and clinical researchers played prominent roles, demonstrating that Australia is a key player in globally significant translational research," Professor Roberts said.

For their roles in the discovery and development of venetoclax, Associate Professor Peter Czabotar, Professor David Huang, Professor Guillaume Lessene and Professor Roberts were awarded the 2019 Prime Minister's Prize for Innovation (p31).

Below: Cancer survivor Deborah Sims (right), with Institute cancer researcher Professor David Vaux, said access to funded treatments was crucial for people with cancer.

Centenary Campaign: investing in the next generation of scientific leaders

Thanks to the tremendous generosity of donors to the Centenary Campaign, 26 early-career researchers have been able to make outstanding achievements in their fields.

Philanthropy has, and continues to be, an integral force that drives the Walter and Eliza Hall Institute's success as a world-class medical research facility.

The Centenary Campaign was launched during the Institute's centenary year in 2015 to support bright young scientists with early-career fellowships, as well as other priority projects at the Institute. Early-career researchers who, due to their comparative lack of track record when compared to older, more established researchers, often struggle to secure highly competitive government funding.

Outstanding achievements

Together, Centenary donors have pledged a remarkable $46.1 million to the Institute's talented early-career researchers, providing a supportive environment that encourages their curiosity, builds their resilience and enables their bright scientific minds to shine.

Outstanding research undertaken by Centenary Fellows is leading to new diagnostic methods for coeliac disease and pancreatic cancer, uncovering the causes of immunodeficiency diseases and multiple sclerosis, and investigating breakthrough therapies for motor neurone disease, rheumatoid arthritis and lupus, cancers and Parkinson's disease.

Clinician-researcher and Mathison Centenary Fellow Dr Maryam Rashidi said the fellowship had opened up several exciting new opportunities in her medical research journey. "I feel I am closer to my ultimate goal – bridging the bench-to-bedside gap by applying scientific discoveries to clinics," Dr Rashidi said. "The fellowship provides a fantastic opportunity to research big questions that require a long time to build on."

These fellowships have often been offered in fields that are vitally important but do not typically attract government grants, including statistical genetics, bioinformatics and genome engineering. Centenary Campaign donors have also enabled the Institute to accelerate its drug discovery initiatives, invest in cutting-edge technology, and kick-start 'blue sky' research projects that often struggle to receive financial support in the early stages.

Transformative impact

Professor Doug Hilton said the Centenary Campaign demonstrated the transformative impact a major gift can achieve.

"As this phase of the Centenary Campaign draws to a close, we have the opportunity to reflect upon the long-lasting impact of donors' support in advancing medical discoveries at the Institute. I am delighted with the success of the campaign and am deeply appreciative of all of the dedicated donors for partnering with us to attract and develop the emerging leaders of tomorrow," he said.

To all of the Institute's supporters – thank you.

Above: Clinician-researcher Dr Maryam Rashidi is the Mathison Centenary Fellow, supported by the University of Melbourne, and is studying proteins that are therapeutic targets for lupus and cancers.

Our supporters

The supporters who make our discoveries possible.

The advances in medical science at the Walter and Eliza Hall Institute are made possible by our generous supporters. We are proud to acknowledge these gifts, grants and bequests received from 1 January to 31 December 2019. Gifts of $1000 or more are acknowledged, unless otherwise requested by our donors.

The Institute also acknowledges the support of the Australian Government and the Victorian Government, and the support of our community who pay the taxes that enable funding through these governments.

Centenary Donors

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Mr Patrick O'Connor and Ms Nadia Kadlof
Mr Ivan Pavlov
Norma Phillips
Mr Rory Pincott
Mr Sean Rao
Mr David Reaburn
Ms Deborah Reich
Mrs Janet Richards and Mr Keith Richards
Mr Colin Sakinofsky
Mr Blair Sanderson
Mr Ian Scott
Mr Brian Siepen
Dr D R Smith
Mr Robert Stephenson and Mrs Robyn Stephenson
Mr Tom Stianos and Dr Jenny Papanicolaou
Mrs Elizabeth Swain
Mrs Kay Szonert and Mr David Savenake
Mr John Thornton and Mrs Gwen Thornton
Mr Robert Vance and Mrs Claire Vance
Mr John Walker QC and Mrs Angela Walker
Mr Mark Whinfield
Mrs Ursula Whiteside
Ms Marjorie Wilks

Community organisations

Auburn South Primary School 4183
Australian Rotary Health
Berwick Opportunity Shop
Coolah Valley Golfers
Fox Classic Car Collection
Gundagai Golf Club Lady Members
Miriam Vale Golf Club Lady Members
Rotary Club of Melbourne
The Probus Club of Melbourne Incorporated
The Victoria Golf Club Ltd
Twin Towns Services Community Foundation
Yarra Yarra Golf Club

Community fundraisers

Bottoms on the Grass
Louise Cranwell
TOM (Type One Melbourne)
The Winter Ball – Lisa Bardas and Ellie Rogers

Companies and institutions

Australian China Education Foundation
Bodhi Foundation
Burwood Nominees
Denton Corker Marshall
Donald Cant Watts Corke
Future Generation Investment Company
Lomond Hotel
National Foundation for Australia-China Relations
Strathmore Community Bank Branch of Bendigo Bank

Gifts in Wills

(Listed by bequest amount)

Estate of Patricia Desiree Field
Albert H Maggs Charitable Trust
Estate of John Arthur Starr
Estate of Sheila Mary Helpman
Estate of Valerie May Moody
Estate of Margaret Frances Houston
Estate of Maxwell Gardiner Helpman
Estate of Beryl Jean Collett
Estate of the late Sylvia Lorraine Taylor
The Jakob Frenkiel Charitable Trust
The Hazel & Pip Appel Fund
Frederick and Winifred Grassick Memorial Fund
Estate of June Beverlie Rahn

Estate of Eleanor Margrethe Albiston (The Stang Bequest)
Irene & Ronald MacDonald Foundation
Estate of Ethel Mary Drummond
Edith Dawn Picton Charitable Trust
Estate of Edward William Pick
Estate of Florence Mary Young
Estate Lindsay James Baldy
Estate of Emily Vera Winder
Estate Of Margaret Wilkinson
Estate of the Late Elizabeth Anne McLaughlin
Estate of George Findon Miller
Estate of Pamela Elizabeth Stinton
Estate of Freda Margaret Clayton
Rigg Memorial Trust
Agnes Maude Reilly Charitable Trust
The George Thomas & Lockyer Potter Charitable Trust
The C.H. Boden Memorial Trust
John Frederick Bransden Charitable Trust
Margaret Lewis Reilly Charitable Trust
Estate of Toni Gertrude Cunningham
Estate of Debra Joy Trickey
Estate of the late Doreen Merle Taylor

International grants

(Listed by grant amount)

Grants of more than $500,000

Leukemia & Lymphoma Society, US
The Wellcome Trust, UK
The Wellcome Trust (HHMI), UK
The Bill & Melinda Gates Foundation, US

Grants of up to $500,000

Breast Cancer Research Foundation, US
JDRF, US
Silicon Valley Community Foundation, US
Worldwide Cancer Research, UK
National Institute of Health, US
Melanoma Research Alliance Foundation, US

Grants of up to $100,000

Rubicon Fellowship, Netherlands
The Michael J. Fox Foundation for Parkinson's Research, US
National Psoriasis Foundation, US

Australian grants

Australian Government, including:
(Listed by grant amount)

National Health and Medical Research Council
Medical Research Future Fund
Australian Research Council
Cancer Australia
Australian Academy of Science
Department of Foreign Affairs and Trade

Victorian Government, including:
(Listed by grant amount)

Victorian Cancer Agency
Department of Health and Human Services
Victorian Comprehensive Cancer Centre

Other Australian grants
(Listed by grant amount)

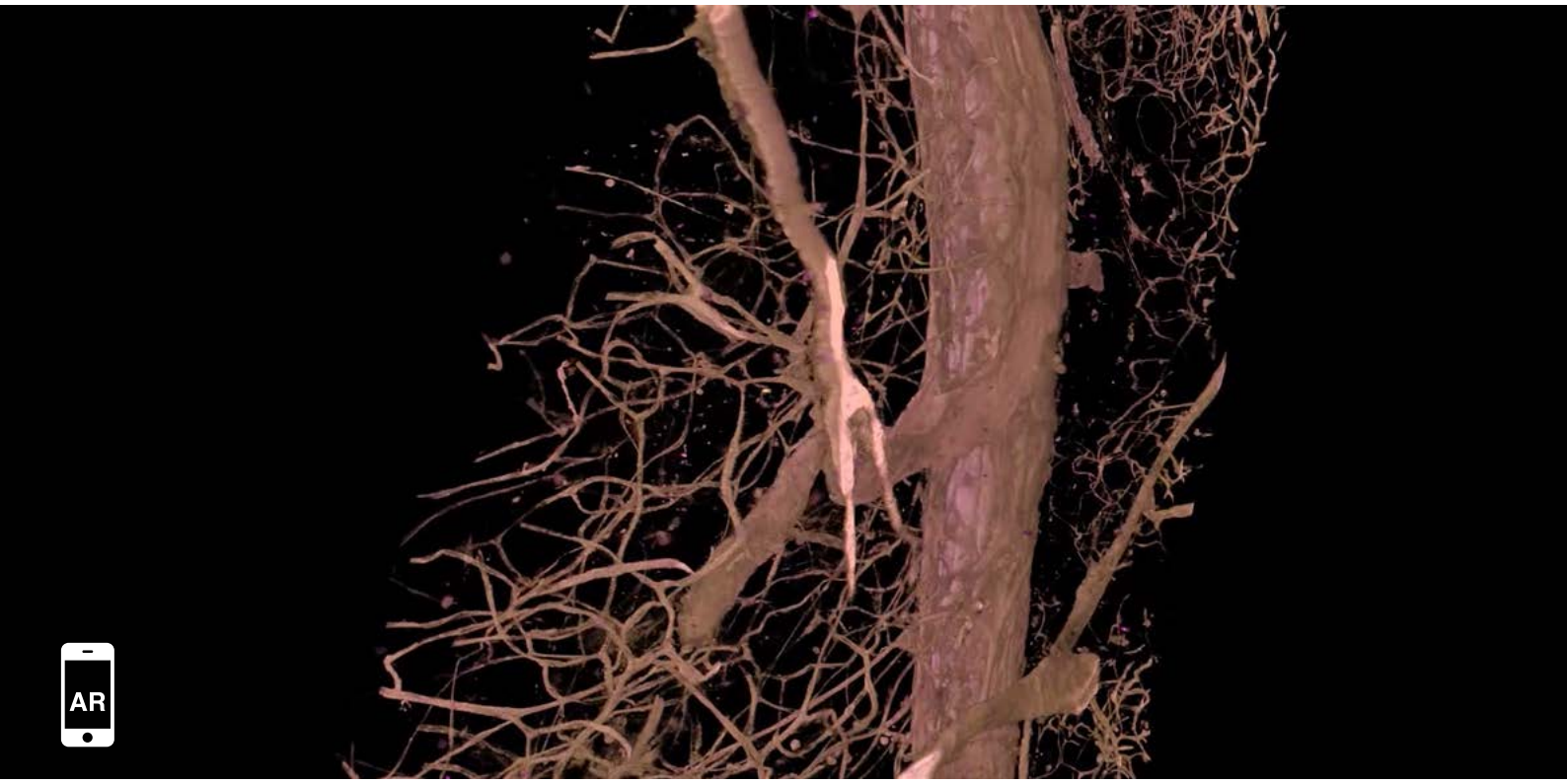
Colonial Foundation
Sylvia & Charles Viertel Charitable Foundation
The Cancer Council Victoria
The Yulgilbar Foundation
Leukaemia Foundation
DHB Foundation
The National Breast Cancer Foundation
The Harry Secomb Foundation
Bellberry Foundation
Lowry Medical Research Institute (MacTel)
Cure Brain Cancer Foundation
Australian Centre for HIV and Hepatitis Virology Research
JDRF Australia
Percy Baxter Charitable Trust
FSHD Global Research Foundation
The Jack Brockhoff Foundation
Cure Cancer Australia Foundation
The Ian Potter Foundation
The Phyllis Connor Memorial Trust
Harold and Pam Holmes Charitable Trust
Motor Neurone Disease Research Institute
The Royal Melbourne Hospital Foundation
The Collie Foundation
Portland House Foundation
The Marian & E. H. Flack Trust
The Scobie and Claire Mackinnon Trust
Coeliac Australia
The Geok Hua Wong Charitable Trust
L.E.W. Carty Charitable Fund
Joe White Bequest
CF Leung Memorial Trust
Cerebral Palsy Alliance
The Lindsay & Heather Payne Medical Research Charitable Foundation
Drakensberg Trust
National Foundation of Medical Research and Innovation
The CASS Foundation Limited
Harold & Cora Brennen Benevolent Trust
Haematology Society of Austalia and New Zealand
The Financial Markets Foundation for Children
The Thomas William Francis & Violet Coles Trust
Janko-Inge Foundation
Australian Centre of Research Excellence in Malaria Elimination
Amelia Eliza Holland Trust
The Kids' Cancer Project
Prader-Willi Research Foundation of Australia
Isabella and Marcus Foundation
Rae Foundation
Pancare Foundation
The Barbara Luree Parker Foundation Ltd
Allergy and Immunology Foundation of Australia
Bell Charitable Fund
Mutual Trust Foundation
Nell & Hermon Slade Trust
The William Angliss (Victoria) Charitable Fund
S.T.A.F - Rupert Ethel & Ronald Fraser & Ruby Thomas
Lung Foundation Australia
The J Elliston Endowment
Anonymous (1)

Trustee companies

Australian Executor Trustees
Equity Trustees
Perpetual Trustees
State Trustees

EXCEPTIONAL SCIENCE AND PEOPLE

PhD student Anna Gabrielyan (right), with co-supervisor Dr Rebecca Feltham, is studying the molecules that control whether cells live or die, and their role in cancer. Ms Gabrielyan joined the Institute through our International PhD Scholar Initiative.



Imaging advance reveals breast cancer secrets

A new imaging technique developed by Institute scientists has uncovered how breast cancers may 'transform' to evade treatment.

The transformation of normal cells in the breast to cancer cells occurs in many stages. Pre-cancerous cells evolve into early-stage cancer cells, which may then undergo changes that make the cells more likely to spread away from the tumour.

"It means the cells are a 'moving target' – they can evade one set of weapons we have to fight cancer, meaning we need to develop new strategies."

A research team, led by Dr Anne Rios, and Professors Jane Visvader and Geoff Lindeman, developed a new imaging technique to visualise key steps in the evolution of cancer cells within tumours, revealing how breast cancers may evade treatment.

A deadly transformation

Professor Visvader said the research showed that breast cancer cells were inherently changeable, morphing from one cell type to another at the molecular level to resemble cells that are more likely to spread.

"Using a new imaging technique, we revealed that only a small proportion of pre-cancerous cells will develop into tumours. However, once a tumour has formed, it is very likely that the cells will undergo epithelial-to-mesenchymal transition (EMT) – a change in the 'molecular landscape' that causes individual cancer cells to transform into cells with a potential growth advantage," Professor Visvader said.

"Our models suggest that EMT is not a rare event but is an inherent feature of mammary tumour cells. If EMT frequently occurs in breast cancers, it means the cells are a moving target – they can evade one set of weapons we have to fight the cancer, meaning we need to develop new strategies that are more broadly targeted."

New view into tumours

Dr Rios said a new 3D imaging technique was critical for the discoveries, involving collaboration with the Institute's Centre for Dynamic Imaging and bioinformaticians.

"We developed a new, rapid way to prepare tissue samples that retains their intricate architecture but allows us to distinguish individual cells and the 3D structure of the tissue. This enabled us to capture previously unseen images of breast tissue and mammary tumours, which was crucial for us to discover the frequency of EMT within the tumours," she said.

Above: A new imaging technique has allowed our researchers to view the intricate detail of mammary ducts, a component of the human breast. This video shows the 3D view of the structure of a mammary duct.
Video from Rios, Visvader et al, Cancer Cell.

BRAIN data to improve cancer care

Despite improvements in survival in other cancer types, survival rates from brain cancer remains low and there has been little change over the past three decades.

Brain cancer is the most common cause of cancer-related death in adults aged under 40 years.

Institute clinician-scientists Dr Lucy Gately and Professor Peter Gibbs have developed BRAIN, an Australian brain tumour registry that will provide crucial data to meet the challenges of brain tumour management and research.

"We're optimistic that the BRAIN registry will improve the outcomes of patients living with brain tumours."

Improving survival rates

Dr Gately, who is a medical oncologist at Cabrini Health and within the Victorian Comprehensive Cancer Centre, said the BRAIN registry would collect and manage data on symptoms, diagnostic tests, treatments and outcomes for patients with all types of brain cancer.

"It has been difficult for any single Australian healthcare centre to accumulate sufficient numbers of patients with brain tumours to generate meaningful research," Dr Gately said.

"BRAIN will create a substantial resource of information on brain tumours for clinicians, as well as support translational research and become a platform for conducting prospective clinical trials," she said.

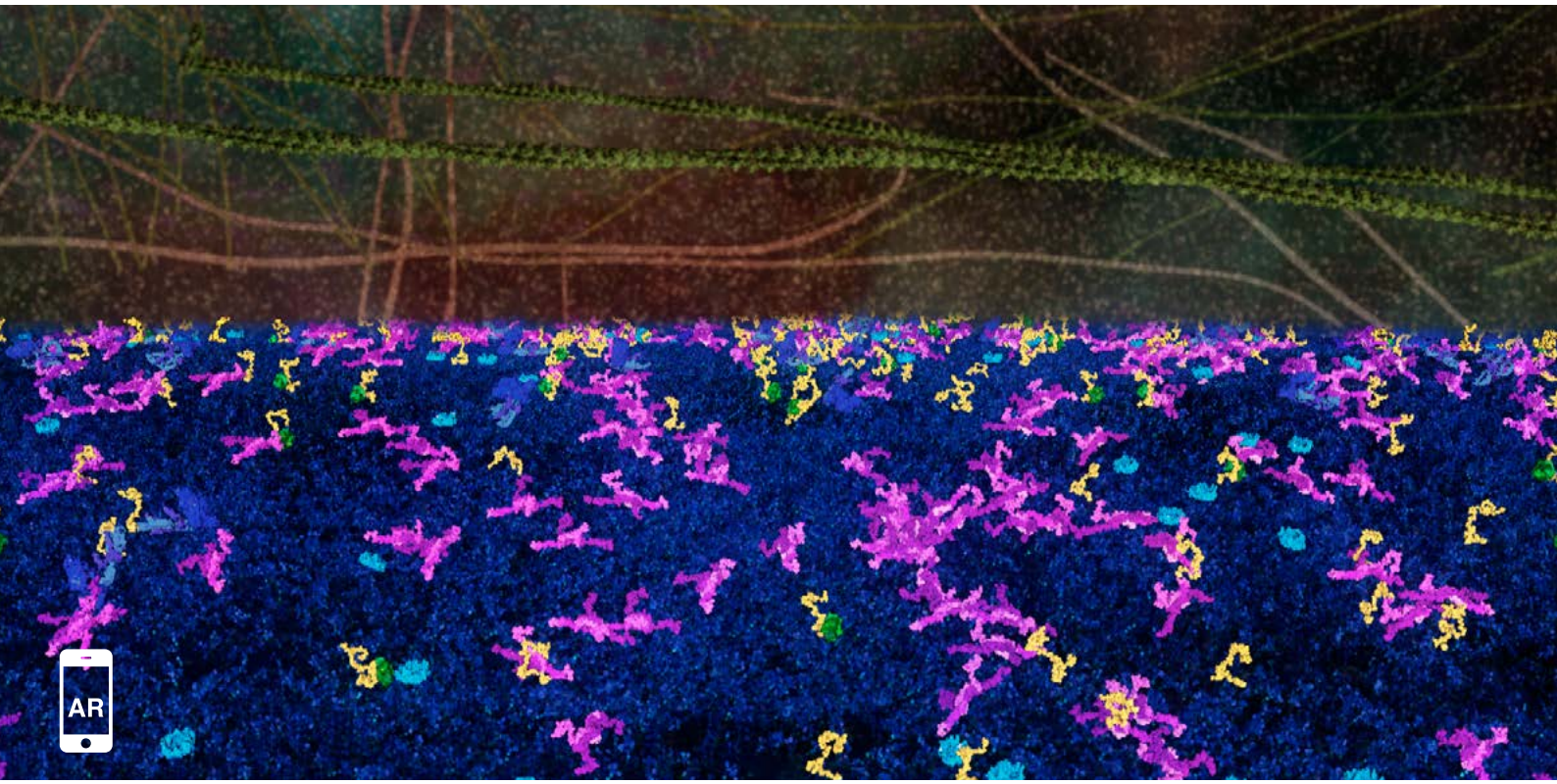
"We're optimistic that the BRAIN registry will improve the outcomes of patients living with brain tumours, providing information resources for for clinicians."

World-first registry trial

EX-TEM is the world's first registry trial in brain cancer, leveraging off data collected by the BRAIN registry. The trial will evaluate the optimal duration of treatment with the chemotherapy drug temozolomide following radiation therapy in patients with newly diagnosed glioblastoma, an aggressive type of malignant brain tumour.

"The EX-TEM trial has been running for 18 months and is currently recruiting at 16 sites across Australia. Results are anticipated in three to five years," Dr Gately said.

Below: Clinician-scientist Dr Lucy Gately and colleagues developed the BRAIN registry, which will provide crucial data for brain cancer management and research.



Protein 'hit and run' may trigger cell death

The discovery could lead to new and improved cancer treatments

For more than 30 years, Institute researchers have been painstakingly unravelling the complex processes of apoptosis – or cell death. Their discoveries have led to a transformation in our understanding of, and treatments for, cancers – especially blood cancers such as lymphoma.

Understanding cell death

Many different stimuli can trigger apoptosis. Activated proteins called BAX and BAK create holes in the mitochondria – the 'powerhouse' of cells – which, once damaged, commit the cell to die. However there was a missing link: how is BAX prompted to move to mitochondria once cell death is initiated?

A research team led by Dr Michael Dengler and Professor Jerry Adams discovered a 'hit-and-run' protein interaction could be the answer.

"Our discovery may eventually underpin the search for drugs that promote apoptosis by activating BAX, which may have potential for treating cancer."

Professor Adams said he hoped the research would lead to new and improved disease treatments. "Our discovery may eventually underpin the search for drugs that promote apoptosis by activating BAX, which may have potential for treating cancer. Conversely, drugs that block BAX activation could help to prevent the harmful cell death that occurs in neurodegenerative disorders or stroke," Professor Adams said.

Different sites, different roles

In the new study, Dr Dengler said the team revealed that two different parts of BAX could bind to BH3-only proteins. Intriguingly, these sites functioned at different stages of BAX activation.

"One site prompted BAX to move to the mitochondrial membrane. The binding of BH3-only proteins to this site on BAX changed BAX's structure, releasing a 'tail' that anchors BAX to mitochondria. However when BH3-only proteins bound to the other site on BAX, BAX became able to damage the mitochondria," Dr Dengler said.

The first, early activation step had probably gone unnoticed because it appeared to involve a transient 'hit-and-run' interaction between the proteins. "We think this first step might be a way that BAX activation can be fine-tuned," he said.

The research involved critical collaborations with structural biology and proteomics researchers at the Institute, aided by the Australian Synchrotron and the CSIRO Collaborative Crystallisation Centre.

Above: Cell death proteins BAX and BAK combine to create a hole in the mitochondrial membrane, committing the cell to die. Still from WEHI.TV animation 'Apoptosis and venetoclax'.

Dr Tracy Putoczki

Halting the chatter to stop cancer

Dr Tracy Putoczki is studying the who, what, where, when and why of cancer cell communication. In 2019, she was awarded a highly competitive $1.25 million Viertel Fellowship to study how communication between tumours and their environment helps cancers grow and spread. The five-year fellowships are awarded by the Sylvia and Charles Viertel Charitable Foundation and administered by Equity Trustees.

Dr Putoczki said understanding how and where cancer cells are 'chatting' could reveal ways of disrupting these conversations to treat or eliminate cancer.

"We are just beginning to understand how cells in the tumour environment influence cancer growth and disease progression. The tumour microenvironment also influences whether a tumour will respond to cancer therapies, and whether the cancer will relapse," Dr Putoczki said.

The research could have an impact on two of the biggest cancer killers in Australia – pancreatic and bowel cancers. "I'm very grateful for the Viertel Foundation's investment in helping us achieve this goal," she said.

Unique lung cancer traits key to targeted therapies

Personalised therapies could exploit secondary mutations to conquer a common cancer driver.

More than one in three lung cancers called adenocarcinomas have a common cancer-causing mutation in the gene *KRAS*, which is a potent cancer driver.

However targeted or 'personalised' cancer treatments are not available for people with KRAS-positive lung adenocarcinomas and, despite decades of attempts, development of a therapy that targets the *KRAS* gene have been unsuccessful.

Now Institute lung cancer researchers have shown that co-existing mutations in KRAS-positive lung cancers can give the tumour distinctive characteristics. Using strategies that target these mutations, they were able to significantly slow the growth of lung tumours in preclinical models.

The study, led by Dr Kate Sutherland and Dr Sarah Best, suggests this tactic should be investigated for targeted treatment of KRAS-positive human lung adenocarcinomas.

Targeting tumour traits

Dr Best said the researchers were surprised to find that co-existing mutations could play such a significant role in the characteristics of some lung cancers.

"In this study, we showed that KRAS-positive lung adenocarcinomas looked and behaved very differently depending on co-existing mutations in the tumour," Dr Best said.

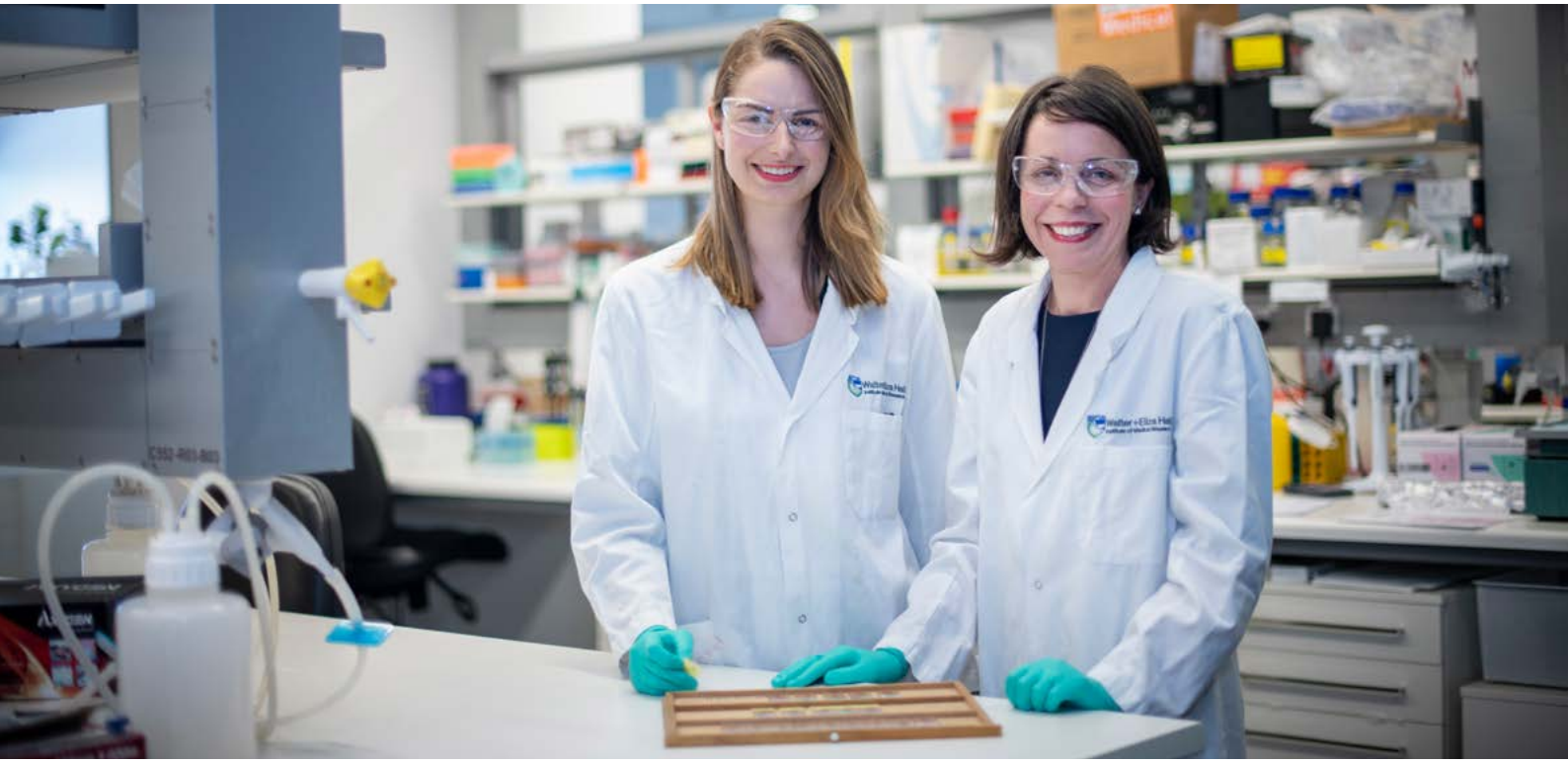
"Cancers with a co-mutation in the gene *TP53* were flooded with immune cells, while tumours with a co-mutation in the gene *KEAP1* changed their metabolism – how they make energy to fuel the tumour cell. We exploited these unique tumour traits, either by depleting the immune cells in tumour tissue or blocking the energy-producing machinery, and this proved effective in inhibiting tumour progression."

"Our study suggests that some patients with KRAS-positive lung adenocarcinomas could benefit from targeted therapies that exploit the differences, rather than the similarities, in these tumours."

Targeted therapies to deplete immune cells or inhibit metabolic machinery were being explored in human trials for other types of cancers, Dr Best said.

"Our study suggests that some patients with KRAS-positive lung adenocarcinomas could benefit from targeted therapies that exploit the differences, rather than the similarities, in these tumours. This approach could make a real difference for patients with these lung cancers."

Below: Dr Sarah Best (left) and Dr Kate Sutherland found distinctive characteristics in lung cancers that could be targeted to slow tumour growth.



International team discovers new human disease

Scientists from Australia and the US discovered and identified the genetic cause of a previously unknown human autoinflammatory disease.

Autoinflammatory diseases are caused by abnormal activation of the innate immune system, leading to recurrent episodes of fever and inflammation that can damage vital organs.

New research has found that the autoinflammatory disease, which they termed CRIA (cleavage-resistant RIPK1-induced autoinflammatory) syndrome, is caused by a mutation in a critical cell death component called RIPK1. The patients who were diagnosed with the new autoinflammatory disease had a host of other inflammatory symptoms which began in childhood and continued into their adult years.

The study was led by Institute scientists Dr Najoua Lalaoui and Professor John Silke, along with Dr Steven Boyden, Dr Hirotsugu Oda and Dr Dan Kastner from the National Institutes of Health (NIH), US, and published in *Nature*.

Discovering a new disease

Dr Lalaoui said the research team had identified the new human autoinflammatory disease and the associated mutation in a critical cell death molecule that was driving the disease.

"Cell death pathways have developed a series of inbuilt mechanisms that regulate inflammatory signals and cell death, because the alternative is so potentially hazardous," she said. "In this disease however, the mutation in RIPK1 overcomes all the normal checks and balances that exist, resulting in uncontrolled cell death and inflammation."

In their research paper, the scientists describe patients from three families with a history of episodic high fevers and painful swollen lymph nodes. The NIH research team sequenced the entire exome of each patient and discovered unique mutations in the exact same amino acid of RIPK1 in each of the three families.

Dr Lalaoui said she and her colleagues at the Institute confirmed the link between the RIPK1 mutations and CRIA syndrome in laboratory models. "We showed that mice with mutations in the same location in RIPK1 as in the CRIA syndrome patients had a similar exacerbation of inflammation," she said.

> *"RIPK1 inhibitors may be just what the doctor ordered for these patients."*

Professor Silke has been studying cell death for more than 20 years and said RIPK1 was a critical regulator of inflammation and cell death.

"RIPK1 is a potent molecule and the cell has developed a way of managing its effects, which includes cleaving RIPK1 into two pieces to 'disarm' the molecule and halt its inflammatory activity. In this autoinflammatory disease, the mutations prevents the molecule from being cleaved into two pieces, resulting in uncontrolled cell death and inflammation," he said.

Potential for new treatments

Dr Dan Kastner – widely regarded as the 'father of autoinflammatory disease' – said that RIPK1 inhibitors may provide a focused, 'precision medicine' approach to treating patients.

"Understanding the molecular mechanism by which CRIA syndrome causes inflammation affords an opportunity to get right to the root of the problem. RIPK1 inhibitors may be just what the doctor ordered for these patients. The discovery of CRIA syndrome also suggests a possible role for RIPK1 in a broad spectrum of human illnesses, such as colitis, arthritis and psoriasis," he said.

Above: Dr Najoua Lalaoui and her collaborators identified a mutation in the gene RIPK1 was the cause of a previously unknown human autoinflammatory disease.

Gluten response in coeliac patients could lead to diagnostic test

Coeliac disease affects approximately 1.4 per cent of people globally, many of whom remain undiagnosed.

Symptoms of the disease are caused by a damaging immune response to gluten. After consuming gluten, patients can experience reactions such as nausea, vomiting, abdominal pain and diarrhoea.

Now, researchers have found distinct markers in the blood of people with coeliac disease that could lead to a world-first blood test for diagnosing patients.

Rapid detection

Associate Professor Jason Tye-Din, head of coeliac research at the Institute and a gastroenterologist at The Royal Melbourne Hospital, said work was now underway to explore the development of a simple blood test for coeliac disease.

"For the many people following a gluten-free diet without a formal diagnosis of coeliac disease, all that might be required is a blood test before, and four hours after, a small meal of gluten."

"For the many people following a gluten-free diet without a formal diagnosis of coeliac disease, all that might be required is a blood test before, and four hours after, a small meal of gluten," Associate Professor Tye-Din said.

"This would be a dramatic improvement on the current approach, which requires people to actively consume gluten for at least several weeks before undergoing an invasive procedure to sample the small intestine," he said.

The research included the world's top coeliac disease experts from the Walter and Eliza Hall Institute, University of Oslo (Norway), Massachusetts General Hospital (US) and University of Chicago (US). The study was led by Boston-based biotechnology company ImmusanT Inc.

Inflammatory clue

Dr Bob Anderson, a joint senior author on the paper, said the new findings could address an important medical need.

"The unpleasant symptoms associated with the disease are linked to an increase in inflammatory molecules in the bloodstream, such as interleukin-2 (IL-2), produced by T cells of the immune system. This response is similar to what happens when an infection is present, however for people with coeliac disease, gluten is the trigger," Dr Anderson said.

Researchers at ImmusanT first discovered the immune markers while assessing blood samples during the phase 1 trial of a potential coeliac therapy. Gastrointestinal symptoms in patients injected with the gluten peptides, particularly nausea and vomiting, correlated with higher levels of IL-2 in their blood. Subsequent testing showed the consumption of gluten produced the same IL-2 response in people with coeliac disease.

Below: Associate Professor Jason Tye-Din (right) collaborated on an international project that identified a potential blood test for coeliac disease.

Dr Christine Keenan

Breathing life into a new asthma treatment

Asthma is the most common chronic lung disease worldwide. It is debilitating, life-threatening, rising in incidence and currently without a cure.

Dr Christine Keenan and her colleagues have discovered a potential new treatment for asthma that works by targeting the cause of the disease, rather than just masking its symptoms. Dr Keenan's significant contribution to the study led to her being awarded the 2019 Research Australia Griffith University Discovery Award.

Dr Keenan said the team, which included colleagues Associate Professor Rhys Allan and Professor Stephen Nutt, and collaborators at the University of Newcastle, identified a small molecule inhibitor, or drug, was able to 'switch off' and reverse the uncontrolled inflammation responsible for driving and exacerbating asthma.

"Our early research identified that the enzyme Ezh2 was critical to the immune system's ability to drive inflammation in response to allergens. This indicated an Ezh2 inhibitor drug could effectively suppress inflammation in an allergic response," Dr Keenan said.

"I have been researching asthma in the preclinical setting for a long time and have never seen a treatment wipe out signs of an allergic immune response like this before. It's exciting because these findings could be the stepping stone to developing an effective new treatment for allergic asthma," she said.

Antiviral immune discovery could lead to better vaccines

Molecular 'switch' that controls how we respond to viral infections could improve future vaccines.

Antibodies are essential proteins produced by our immune system in response to an infection. They specifically bind to other proteins – such as those on a microbe's surface – and are important for protecting us against repeat infections by the same microbe.

Vaccines, such as those for measles or polio, work by stimulating the production of antibodies that are specific to an infectious disease. This prevents the infection from establishing.

"This discovery could underpin the development of better vaccines to prevent viral diseases."

PhD student Amania Sheikh and Dr Joanna Groom discovered that the protein T-bet determines how the immune system responds to viral infections, and whether or not protective antibodies are produced. They also made the surprising discovery that the immune system protects against different viruses via distinct pathways. Their findings could lead to better strategies to develop vaccines for previously hard-to-prevent viruses.

Switching on immunity

Ms Sheikh, who is enrolled through the University of Melbourne and was first author on the *Cell Reports* publication, said our immune system comprised a complex network of cells and signalling molecules that could produce a range of responses to infections.

"Immune T cells are critical for coordinating specific immune responses, recruiting other cells and directing how we respond to different microbes such as bacteria, fungi or viruses," she said.

Ms Sheikh said the team discovered that T-bet was an essential switch that enabled T cells to stimulate antibody production in response to viral infections. "The level of T-bet in T cells is influenced by factors such as how a virus enters the body, and how much inflammation it triggers in its early stages. This in turn influences the immune response to the virus."

The findings reconcile a controversy in the field about how the immune system can distinguish between different viral infections and respond in distinct ways. The team showed that T-bet was critical for scaling how much antibody production occurred in response to a viral infection.

Better vaccines

Dr Groom said antibodies were an essential component of long-lived immunity to viruses.

"This discovery could underpin the development of better vaccines to prevent viral diseases," she said.

"Most current vaccines to infectious diseases rely on robust and long-lived antibody production. If we can understand the precise triggers controlling how much antibody is produced in response to an infection, we should be able to develop vaccines that act similarly to stimulate protective antibody production."

Below: PhD student Amania Sheikh (left) and Dr Joanna Groom discovered the protein T-bet determines how the immune system develops protective immunity.

New drug target prevents deadly malaria transmission

Using small molecule inhibitors developed at the Institute, the researchers blocked the export of gametocyte proteins – a process essential for malaria transmission.

More than half a million people die from malaria every year and *Plasmodium falciparum* – the most lethal of all malaria parasites – is responsible for 90 per cent of infection cases.

Institute researchers have found a new drug target for stopping the spread of malaria, after successfully blocking *Plasmodium falciparum* from completing the 'transmission stage' of its lifecycle.

Using small molecule inhibitors developed at the Institute, the researchers blocked plasmepsin V, an enzyme essential for the development of gameocytes (sexual stages of the malaria parasite) which are the only form of the malaria parasite that can be transmitted from humans to mosquitoes. The research was led by Associate Professor Justin Boddey, in collaboration with Professor Vicky Avery from Griffith University, Queensland.

Arrested development

Due to the parasite's ability to constantly mutate and develop resistance to therapies, new preventions and treatments that act across different stages of the malaria parasite lifecycle – the liver stage, blood stage and transmission stage – are urgently needed.

"Our research demonstrates that an antimalarial treatment targeting plasmepsin V has potential not only in treatment of the disease, but also as a preventative population control measure."

Using the Institute's insectary facilities, the researchers were able to study how gametocytes transmit malaria from human blood to a mosquito.

Associate Professor Boddey said the team had gained new ground towards malaria elimination because blocking the parasite's transmission stage was important for developing preventative therapies that stop the spread of disease.

"It was exciting to find that plasmepsin V plays a role in malaria transmission, and that our inhibitors could target plasmepsin V and block transmission to the mosquito from occurring," Associate Professor Boddey said.

Disease double whammy

Institute chemical biologist Dr Brad Sleebs said the enzyme was proving to be an ideal drug target because of its importance for parasite survival at different stages of the malaria lifecycle.

"Our research demonstrates that an antimalarial treatment targeting plasmepsin V has potential, not only in treatment of the disease, but also as a preventative population control measure," he said.

Associate Professor Boddey said the aim was to assess plasmepsin V as a multi-stage drug target for treating, as well as preventing, the spread of malaria; and to understand the unique biology occurring during liver infection.

"We are also collaborating with Merck and the Wellcome Trust to develop drugs targeting plasmepsin V in multiple parasite species," he said.

Above: Associate Professor Justin Boddey and colleagues have found a new drug target that could not only treat malaria, but also act as a preventative control measure.

Childhood vaccine linked to decline in diabetes

Rotavirus vaccine, introduced in 2007, could protect children against developing type 1 diabetes.

Since the 1980s, type 1 diabetes incidence has steadily increased in Australia and worldwide, but the reasons for this increase are poorly understood.

Now, a research team have found that a recent drop in the number of young children diagnosed with type 1 diabetes could be associated with the introduction of routine rotavirus vaccination of Australian infants.

"Our latest study suggests that preventing rotavirus infection in Australian infants by vaccination may also reduce their risk of type 1 diabetes."

The rotavirus vaccine is routinely given to Australian infants aged two and four months to protect them against a severe, potentially life-threatening form of diarrhoea.

Fewer cases of diabetes

Type 1 diabetes is a serious, lifelong autoimmune condition, in which the body's immune system destroys pancreatic cells that make insulin, a hormone that controls the level of glucose in the blood.

The collaborative team, involving researchers from the Institute and the Murdoch Children's Research Institute (MCRI), investigated the number of Australian children diagnosed with type 1 diabetes from 2000-2015.

They found that type 1 diabetes diagnoses in children aged 0-4 years declined from 2007 – the year that rotavirus vaccine was introduced as a routine infant vaccination. This is the first time the rate of type 1 diabetes in young children in Australia has fallen since the 1980s.

The significant decrease was not seen in older children aged 5-14, said MCRI study lead Dr Kirsten Perrett. "This suggests the young children could have been exposed to a protective factor that didn't impact older children," she said.

Surprise protection

Institute clinician-scientist and study senior author Professor Len Harrison said that looking for a possible effect of rotavirus vaccination protecting against type 1 diabetes was driven by earlier research from his laboratory.

"Twenty years ago, Institute researcher Dr Margo Honeyman made a discovery that suggested natural rotavirus infection may be a risk factor for type 1 diabetes. She found an association between the appearance of immune markers of type 1 diabetes in children and rotavirus infection. Subsequent studies in laboratory models suggested rotavirus infection of pancreatic cells can trigger an immune attack against the insulin-producing cells – similar to what occurs in type 1 diabetes," he said.

"While not conclusive, our latest study suggests that preventing rotavirus infection in Australian infants by vaccination may also reduce their risk of type 1 diabetes. Following the publication of our results, researchers from the US reported a similar finding in a large number of children. We will continue this research to determine if the decrease in type 1 diabetes continues to be observed."

Above: Professor Len Harrison and his colleagues found that a recent drop in young children with type 1 diabetes could be linked to routine rotavirus vaccinations.

$15 million Colonial Foundation donation supports early detection of dementia

The joint initiative between the Walter and Eliza Hall Institute and The Royal Melbourne Hospital – supported by Colonial Foundation – could lead to an urgently needed dementia test.

Dementia is a major health challenge in Australia. Almost one in 10 Australians aged over 65 has dementia. Early detection of dementia is crucial because, by the time symptoms occur, most of the damage cannot be reversed. However, there is still no diagnostic test available for patients.

Shared vision

With a $15 million philanthropic investment from Colonial Foundation, the Colonial Foundation Healthy Ageing Centre was established as a joint initiative between the Institute and The Royal Melbourne Hospital (RMH).

"The centre is the first of its kind in Australia and will provide a platform for harnessing the latest technology and collaborative power of experts from both oorganisations," Institute director Professor Doug Hilton said.

"The new Colonial Foundation Healthy Ageing Centre will enable our leading clinicians, pathologists and researchers to come together with the goal of developing diagnostic tests for the early detection of neurodegenerative conditions that could cause dementia in people as young as 40," he said.

"It is one of the biggest single philanthropic investments that the Institute has received for its research, and we are grateful to the Colonial Foundation for their vision in supporting this research."

Focus on early detection

Associate Professor Andrew Webb, who co-leads the centre with RMH director of pathology Professor Frank Bowling, said the technology would use blood-borne signatures to detect early dementia.

"We're aiming to identify a diagnostic signature that would inform the development of a preventative treatment for dementia. The intention is for the test to be available through standard pathology services," he said.

> *"The insights gained could lead to exciting advances at the frontier of ageing, such as the development of therapies that halt or slow the progression of dementia."*

The five-year project will analyse genomic and metabolomic information of 20,000 Victorians to create biological signatures of healthy ageing and dementia.

They hope to provide doctors across Australia with accredited tools and tests that make a positive difference to the quality of life for patients and their loved ones.

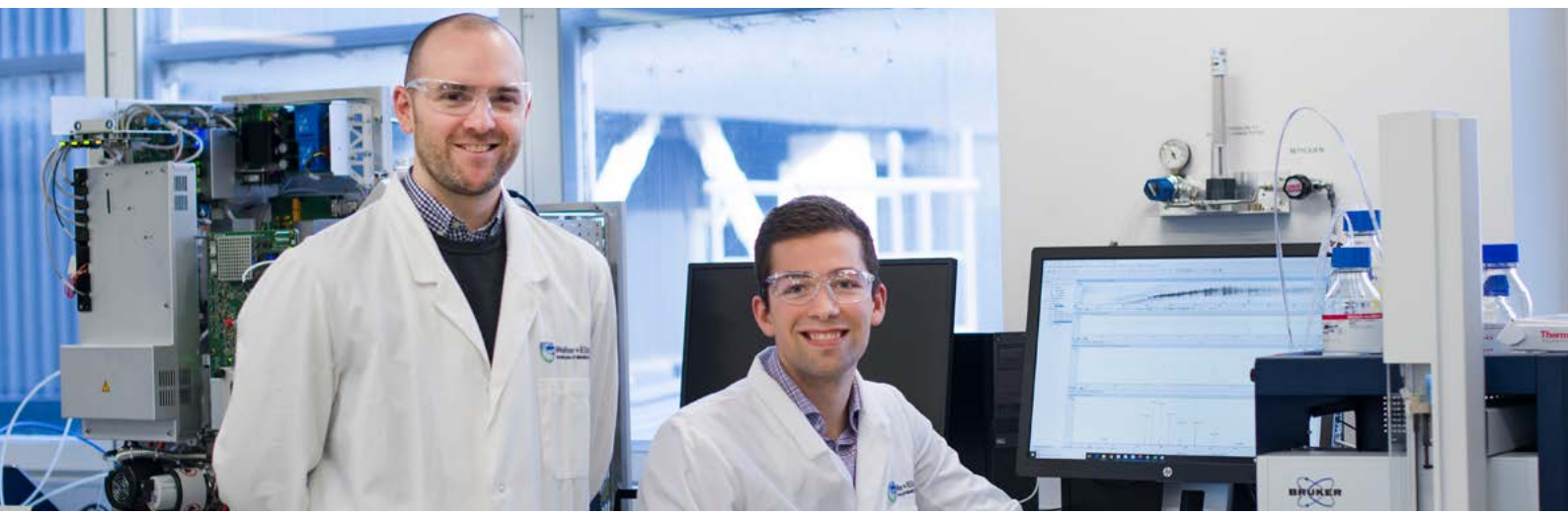
"The insights gained could lead to exciting advances at the frontier of ageing, such as the development of therapies that halt or slow the progression of dementia," Associate Professor Webb said.

Shared vision to improve health

CEO of Colonial Foundation Mr André Carstens said Colonial Foundation, the Institute and RMH had a shared vision for improving the health of all Australians.

"Colonial Foundation wholeheartedly supports this vital project to generate new health strategies that address the growing burden of dementia on our communities. The shared vision of our organisations is to enhance healthy ageing for the future benefit and wellbeing of every Australian," he said.

Below: Associate Professor Andrew Webb (left), with Mr Rune Larsen, is developing an early detection test for dementia.



Cancer-fighting gene also protects against birth defects

Discovery of a molecular mechanism underlying the link between p53 and neural tube development in female embryos explains why females have higher risk of spina bifida and other neural tube defects.

Embryonic development is a very precise and precariously balanced process.

Healthy development of the neural tube is essential for the brain and the spinal cord to form properly. When it doesn't properly form, birth defects such as spina bifida can result.

Cancer gene link

A research team from the Institute and Peter MacCallum Cancer Centre have made the surprise finding in laboratory models that p53, a gene famous for its role in protecting us from cancer, also plays a pivotal role in healthy neural tube development.

"Simply put, healthy neural tube development in the female embryo requires the help of p53."

The study explains p53's involvement in a molecular process specific to females called X chromosome inactivation. The new findings explain why females are significantly more likely than males to be born with neural tube birth defects, such as spina bifida.

The research team was led by Associate Professor Anne Voss, Professor Andreas Strasser and Professor Marnie Blewitt, with collaborators from Peter MacCallum Cancer Centre.

Professor Strasser said the research showed how p53 influenced the function of genes required for fostering the production of healthy neural tube cells in the female embryo.

"Simply put, healthy neural tube development in the female embryo requires the help of p53," he said.

"p53 helps ensure normal levels of Xist RNA are produced, which is part of an intricate molecular process important for X chromosome inactivation. This in turn leads to healthy neural tube development."

Females at higher risk

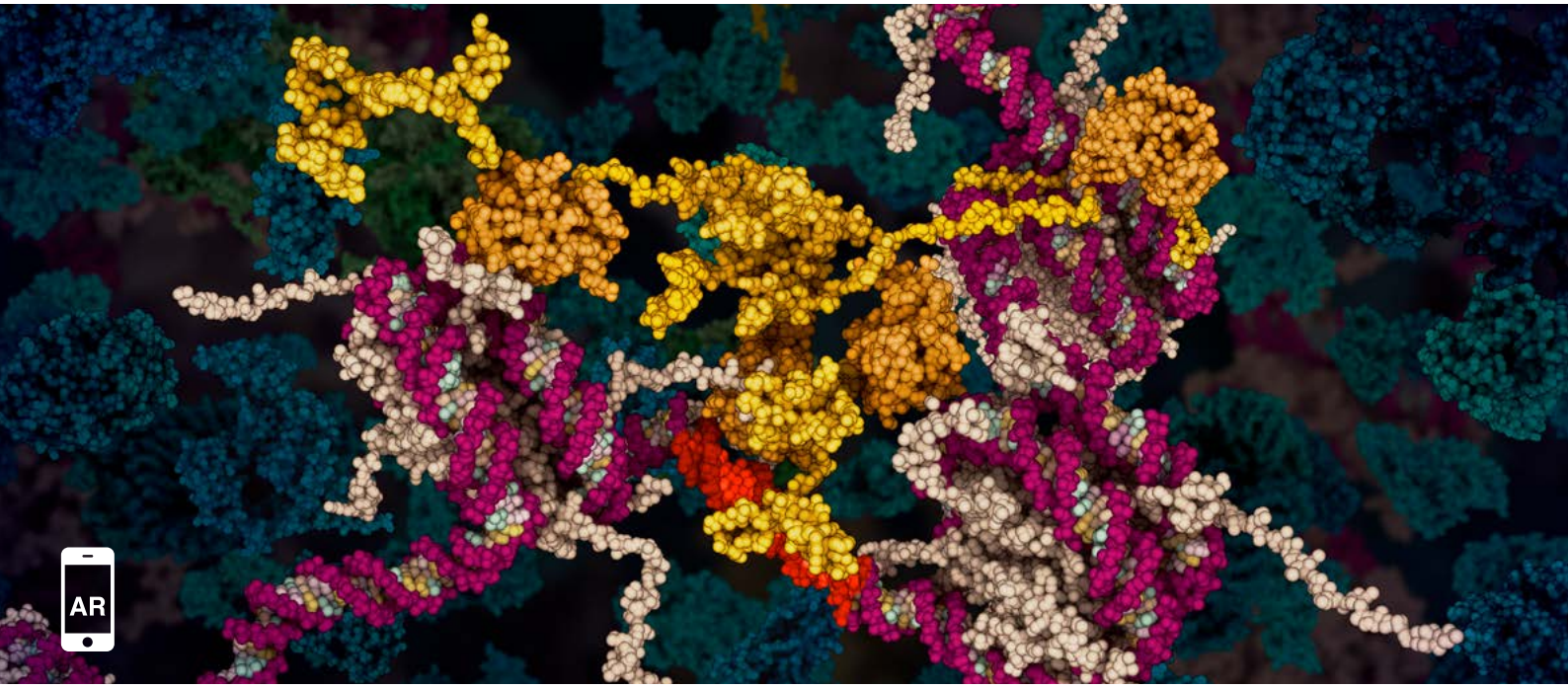
Associate Professor Voss said the study confirmed a long-standing theory that females had an additional risk factor for neural tube defects.

"Females have two copies of the X sex chromosome, while males only have one copy. In order to maintain health in females, one of these X chromosomes must be inactivated in cells early on during development," she said.

If this inactivation does not occur efficiently, the neural tube will not form properly, she said.

"Previous research indicated that p53 played a role in normal neural tube development, but it had never been shown exactly how this worked until now."

Below: p53 is a critical tumour suppressor gene, famous for its role in protecting us from cancer. In this still from WEHI.TV, p53 is shown in yellow, attached to DNA (magenta and multicoloured). Credit: WEHI.TV



Institute scientists among first in world to trial new research tool

A new technique that details subtle changes in our protein code could lead to better understanding of – and treatments for – cancers, neurodegenerative conditions and other diseases.

Ubiquitin is a small protein that can link to other proteins in a cell, either as a single unit or in longer straight or branched chains.

Altered ubiquitination of proteins has been implicated in a range of diseases, including cancer, inflammatory diseases and neurodegenerative disorders such as Parkinson's disease.

> *"The technique could uncover subtle changes that contribute to a range of diseases including cancer, inflammatory conditions and neurodegenerative disorders."*

Australian researchers are among the first in the world to have access to a new approach to understand intricate changes in ubiquitin signalling, which controls how proteins function in our cells in health and disease. The technique was developed by Professor David Komander, who joined the Institute in 2018 and is head of the recently-established Ubiquitin Signalling division. The research, published in *Nature*, was led by Professor Komander while at the MRC Laboratory of Molecular Biology in Cambridge, UK, and involved colleagues at Cambridge and the University of Vienna.

Architectural detail

Professor Komander said protein ubiquitination could impact all cellular processes.

"Ubiquitination can change how proteins function, potentially altering their activity, redirecting them to different parts of the cell, or regulating their interactions with other proteins," he said.

The new proteomics technique, called 'ubiquitin clipping', allows researchers to create high-definition maps showing how proteins are modified by ubiquitination.

"Ubiquitin clipping has enabled us to reveal a whole new level of complexity in ubiquitin signalling. It's the difference between describing a house based solely on the number of walls, windows and doors it has, versus looking at the detailed architectural plans," Professor Komander said.

"The technique could uncover subtle changes that contribute to a range of diseases including cancer, inflammatory conditions and neurodegenerative disorders," he said.

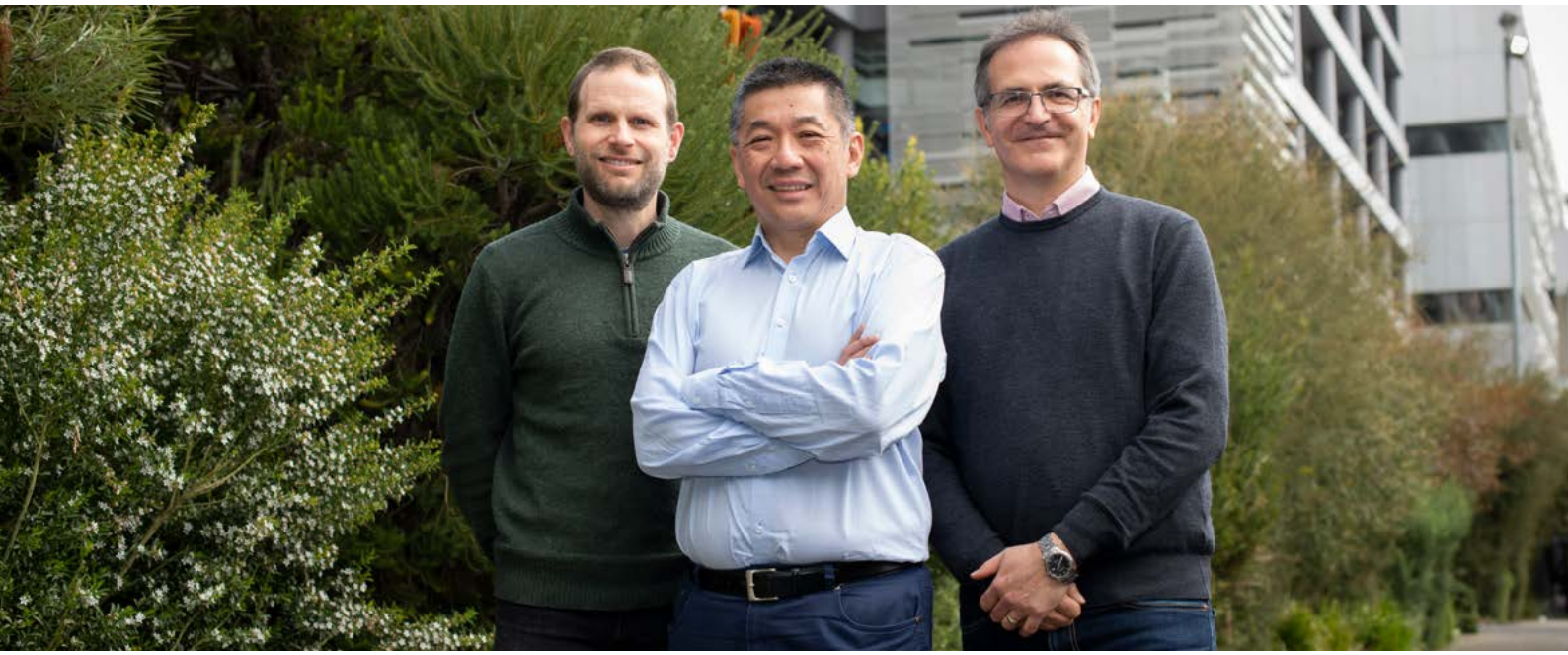
Disease insights

Professor Komander said the ubiquitin clipping technique was already being applied to study patient samples.

"My colleague Dr Rebecca Feltham is using ubiquitin clipping to look for protein ubiquitination patterns in samples from patients with rheumatoid arthritis, a complex inflammatory disease. This could give new insights into how this disease develops and responds to existing therapies," he said.

"Ubiquitination is also a promising target for the development of new drugs and ubiquitin clipping will be a critical aspect of my team's drug discovery research."

Above: Professor David Komander is using the 'ubiquitin clipping' technique to create maps that could reveal subtle genetic changes that contribute to a range of diseases, including cancers, inflammatory diseases and neurodegenerative disorders.



‘Cell death blocker’ prevents healthy cells from dying

Scientists have discovered a proof-of-concept drug that can prevent healthy cells from dying in the laboratory.

Apoptosis is a form of tightly regulated cell death essential for health and development.

The ability to swiftly intervene and prevent cell death – or apoptosis – could be game-changing for medical emergencies and procedures, such as minimising cellular damage after heart attacks, or preserving organs for transplants.

Institute researchers have co-developed a world-first ‘cell death blocker’ that can keep cells alive and functioning in a perfectly healthy state when they otherwise would have died.

The proof-of-concept findings follow 11 years of collaborative research at the Institute, led by Professors David Huang, Guillaume Lessene and Benjamin Kile (now at the University of Adelaide). The Institute’s expertise in cell death research spans more than 30 years.

Professor Lessene, New Medicines and Advanced Technologies theme leader, said the new ‘cell death blocker’ was exceptional for its ability to keep cells alive and healthy in the laboratory. “Never before have we seen such promising ability to intervene in the earliest stages of apoptosis before irreversible damage occurs,” he said.

Invaluable for future of medicine

Professor Huang said the ability to stop unwanted cell death could be invaluable for the future of medical care. “Acute injury can cause cells to die rapidly leading to the loss and weakening of tissues and muscles. In such circumstances, being able to prevent uncontrolled cell death could improve a patient’s recovery, or even their chances of survival,” he said.

The researchers are now looking to apply the knowledge to developing cell death blockers that are effective and safe in humans. The next steps would also involve applying the knowledge gained to more advanced models of disease. “There could be applications for keeping cells alive to prevent degenerative diseases,” Professor Huang said.

“Never before have we seen such promising ability to intervene in the earliest stages of apoptosis before irreversible damage occurs.”

National Drug Discovery Centre

The proof-of-concept drug was developed through extensive medicinal chemistry following a high-throughput screening campaign of a quarter of a million potential small drug molecules. The laboratories involved have since formed the foundation of the Institute’s National Drug Discovery Centre, a world-class facility that has opened for scientists across Australia to pursue their drug discovery journeys without having to head overseas.

This latest research shines light on ‘the other side of the same coin’ – offering hope that one day drugs that successfully intervene to block apoptosis could be used to treat conditions such as cardiovascular diseases and degenerative disorders.

Above: (L-R) Dr Mark van Delft, Professor David Huang and Professor Guillaume Lessene developed a ‘cell death blocker’ that keeps cells alive and functioning in a perfectly healthy state when they otherwise would have died.

(L-R) Professor David Huang, Associate Professor Peter Czabotar, Professor Guillaume Lessene and Professor Andrew Roberts

Innovation Prize for cancer drug discovery

A collaborative team of Institute researchers won the 2019 Prime Minister's Prize for Innovation, one of Australia's most prestigious awards for achievements in science.

Associate Professor Peter Czabotar, Professor David Huang, Professor Guillaume Lessene and Professor Andrew Roberts were recognised for their roles in the discovery and development of anti-cancer drug venetoclax.

The four researchers brought their leadership and individual expertise in cancer biology, drug discovery, structural biology, preclinical testing and clinical trials to the project, making a series of discoveries that were key to the development of the anti-cancer treatment.

Venetoclax is used to treat chronic lymphocytic leukaemia (CLL). Its development began with a landmark discovery made at the Institute in the 1980s that a protein called BCL-2 helps cancer cells survive. In partnership with Genentech, a member of the Roche Group, and AbbVie, the team discovered and developed venetoclax in a remarkably short time, taking less than seven years from its discovery to the first regulatory approval. It was recently listed on the Australian Pharmaceutical Benefits Scheme (p10).

Professor Roberts, who led the world-first clinical trials of venetoclax in Melbourne, said venetoclax was replacing conventional chemotherapy for many patients in Australia and worldwide.

"This really is a triumph of basic science and translational innovation, enabling the generation and rapid regulatory approval of a product that is significantly beneficial for many people," he said.

Associate Professor Czabotar said collaboration was key to the breakthrough cancer drug.

"One of the great things about this award is that it recognises the value and importance of teams in making big discoveries and making big differences," he said.

Watch a video of the team discussing the breakthrough.

Genetic drivers of blood diseases revealed

The findings will help haematologists more accurately diagnose patients with myeloproliferative diseases.

Myeloproliferative diseases are caused by excess production of mature blood cells in the bone marrow.

This abnormal growth can lead to chronic pain and illnesses including bone marrow failure, stroke, heart attack and can progress to become blood cancers such as leukaemia. Myeloproliferative diseases, sometimes called myeloproliferative neoplasms, include disorders such as essential thrombocytopenia, polycythaemia vera and primary myelofibrosis.

Better diagnosis

The researchers revealed seven new genetic mutations that cause myeloproliferative diseases, as well as 90 mutations with the potential to make the disease worse in existing patients. The findings could help clinicians to accurately diagnose patients and potentially lead to new targeted treatments.

Institute researchers Dr Jessica Bridgford, Dr Melissa Call and Associate Professor Matthew Call led the study in collaboration with Institute computational biologist Dr Alan Rubin, Dr Andrew Brooks from the University of Queensland, and haematologists based in Italy.

Efficient new approach

The research team focused on a region of the protein MPL, a known hotspot for mutations that cause uncontrolled blood cell growth.

Dr Call said the team used an advanced new technique called deep mutational scanning (DMS) to fast-track genetic testing and rank mutations from the least to most active in driving disease.

"Older methods require testing the activity of each mutation individually – for our study, this would have taken about three years, with variables that would have been impossible to control," she said.

"Instead, the novel DMS approach took a matter of weeks and allowed us to test 600 protein variants at the same time, under the same conditions."

The team collaborated with haematologists to confirm that many of the newly identified mutations were found in patients with myeloproliferative disease.

> *"Precision medicine holds the promise of transforming how we treat diseases, and it would be wonderful for this to be used in the context of myeloproliferative diseases."*

Dr Call said understanding the disease-causing mutations in individual patients could lead to therapies that target those mutations, shutting down their harmful effects. "Precision medicine holds the promise of transforming how we treat diseases, and it would be wonderful for this to be used in the context of myeloproliferative diseases," she said.

Power of computing

Dr Rubin said data obtained from deep mutational scans is enabling researchers to better understand gene and protein function, measure the involvement of genetic variants in a disease, and investigate how the function of proteins can be enhanced synthetically for the development of new treatments.

"The Enrich2 software package, developed at the Institute, enabled the team to rank mutations from least to most active in driving disease. The study demonstrates the significant power of bioinformatics methods to fast-track fundamental research," he said.

Above: (L-R) Dr Melissa Call, Associate Professor Matthew Call and Dr Jessica Bridgford used an advanced technique to fast-track genetic testing of blood disorders called myeloproliferative diseases.

Dr Onisha Patel

Communication is key for Superstar of STEM

Dr Onisha Patel is as passionate about communicating her science as she is about her research.

She is a 2019 Superstar of STEM – a program run by Science & Technology Australia that is dedicated to creating a critical mass of Australian female scientists and technologists who can be role models for young women and girls considering STEM careers. As part of this program she regularly visits schools and talks about her career path and research.

Dr Patel has participated in Institute Art of Science exhibitions and discovery tours and, in December 2019, won an Institute award for engagement for her commitment to science communication.

As a structural biologist, Dr Patel uses advanced imaging technologies to see details inside protein molecules implicated in cancer.

"Every protein has a unique shape and visualising it offers a way to understand how it performs its biological tasks. When proteins become faulty, they can lead to many diseases including cancer. If we can see details within protein molecules, we are better informed on ways to design novel therapeutics that specifically target them for cancer treatments," she said.

Recently, Dr Patel won an Australian Academy of Science Europe and France Mobility travel fellowship to work with Professor Carolyn Moores at Birkbeck University of London.

"This visit is a great opportunity to build my experience in cryo-electron microscopy (cryo-EM) at this internationally recognised centre of excellence. This experience will also be a huge asset to the new cryo-EM facility being established at the Institute," she said.

(L-R) Professor Gordon Smyth and Associate Professor Melissa Davis

Award-winning team leads bioinformatics program

Professor Gordon Smyth and Associate Professor Melissa Davis are joint heads of the Institute's Bioinformatics division.

In 2019, both researchers won Australian Bioinformatics and Computational Biology Society (ABACBS) Awards. Associate Professor Davis won the Mid-Career Research Award for her computational research contributions and leadership within the Australian computational biology community, and mentorship of the next generation of talented bioinformaticians.

Her computational cancer biology research is working to improve therapies for breast and other cancers. "We take very large data sets to look for patterns associated with patient outcomes – how well patients respond to the treatment they're on, why some do well on a therapy and others don't. Our research looks at how we can target these drugs more effectively to patients to get better outcomes for them," Associate Professor Davis said.

Professor Smyth won the Open Source and Open Science Award for his prolific development of open source bioinformatics tools, support for Bioconductor (open source software) and reproducible research. He also secured almost $300,000 from the Chan Zuckerberg Initiative's Essential Open Source Software for Science program, supporting open source tools critical to science.

He said open source software was an essential tool for reproducible research.

"Bioinformatics and computational biology create powerful and flexible ways to interpret genomic data. Whenever we publish biomedical discoveries, we are able to make available at the same time our bioinformatics code and software packages, allowing other researchers to repeat and validate our analyses," Professor Smyth said.

Rsubread: a cheaper, faster and more accurate data tool

Institute bioinformaticians have developed a new software package that will improve how scientists worldwide interpret their data.

RNA sequencing technology allows scientists to more deeply understand the biology of a cell, in particular the genes that are active in the cell, how these genes are expressed and regulated and how their activity changes during disease.

Bioinformatician Associate Professor Wei Shi develops computational methods that are essential for analysing genomic data generated by next-generation sequencing technologies. These tools take massive amounts of genetic information and process it in ways that enable biology labs to utilise it.

Cheaper, better, faster, stronger

Associate Professor Shi developed a software package called Rsubread that he said is arguably the fastest, most accurate of its kind for quantifying RNA sequencing data.

"Components of this software package have already been used for data analysis in more than 200 studies at the Institute in the past eight years"

A paper published by Associate Professor Shi and his Institute colleagues Dr Yang Liao and Professor Gordon Smyth in *Nucleic Acids Research*, detailed how the software functions. Rsubread is a Bioconductor package which implements R functions, and the paper demonstrated that Rsubread was "more than competitive" against alternative tools, Associate Professor Shi said.

"Rsubread is very easy to use, super-fast and accurate. It also outperformed its competitors in terms of cost and the amount of memory needed to run the algorithms. Components of this software package have already been used for data analysis in more than 200 studies at the Institute in the past eight years," he said.

Collaboration to understand disease

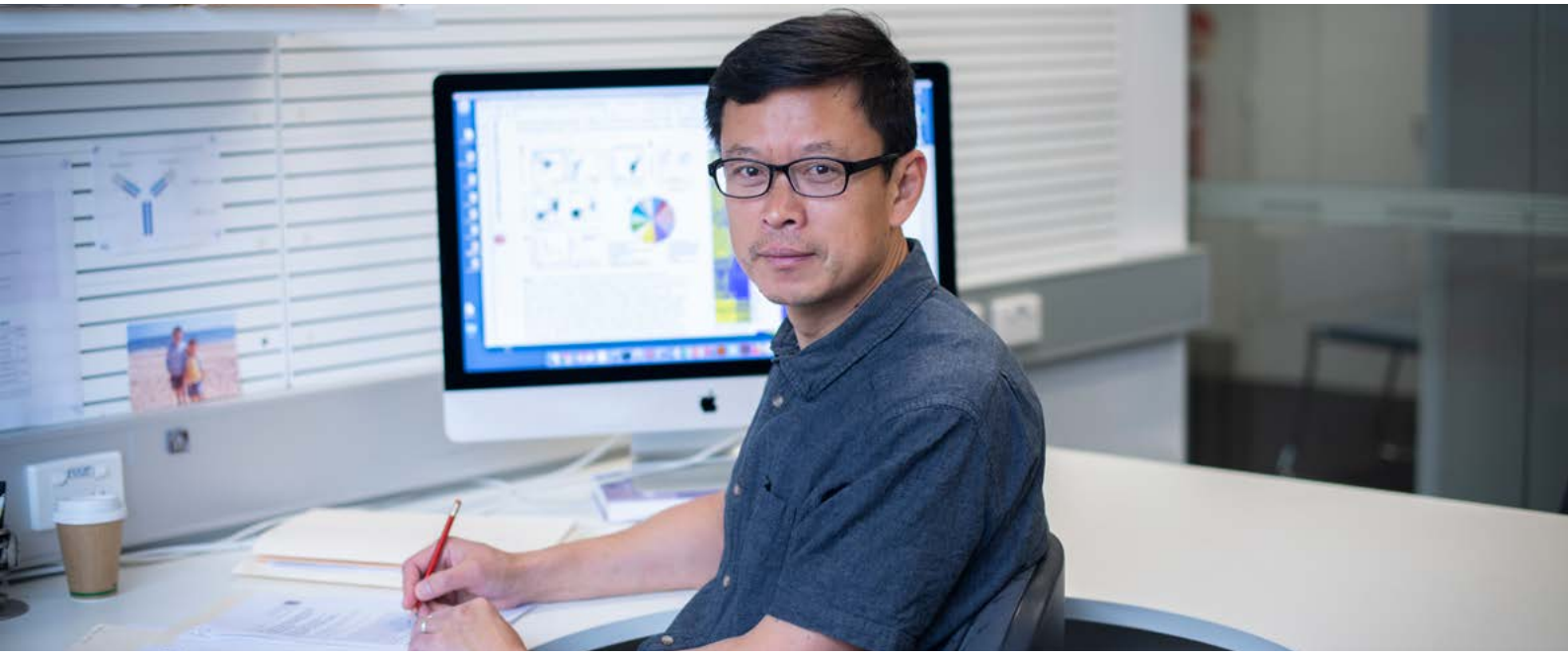
In addition to developing the software, Associate Professor Shi also applies his computational methods in collaborations with biological researchers. One of his particular interests is working with world-leading immunologists to profile global changes of gene expression in immune cells, to discover novel target genes for improved vaccine design and therapy.

In 2019, Associate Professor Shi collaborated with Institute malaria researcher Dr Diana Hansen and immunologist Professor Axel Kallies from the Doherty Institute, discovering that strong inflammatory signals in response to malaria infection drive the immune system to manufacture highly potent antibodies.

"Together we employed our different areas of expertise – in malaria biology, immunology and bioinformatics – to identify the molecule critical for 'training' antibody-producing B cells to become the most effective parasite fighters. Targeting this molecule could be the key to more effective vaccines and treatments for some chronic infections and autoimmune diseases," he said.

Associate Professor Shi's work has been supported by a CSL Centenary Fellowship, providing funding of $500,000 over five years for his research.

Below: Associate Professor Wei Shi and his colleagues developed Rsubread, a software tool to interpret genomic data.



Computational biology predicts melanoma patient outcomes

The identification of a gene signature that predicts the survival rates of melanoma patients could open new opportunities for personalising melanoma therapies.

Melanoma, the most deadly form of skin cancer, is the third most commonly diagnosed cancer in Australia, causing more than 1000 deaths each year.

A team of Institute computational biologists and immune cell researchers collaborated to reveal a gene signature that could predict which melanoma patients had improved rates of survival. The research was led by Dr Fernando Souza-Fonseca-Guimaraes, Dr Joseph Cursons, Professor Nick Huntington and Associate Professor Melissa Davis.

Predicting melanoma outcomes

Melanoma often triggers immune responses, recruiting immune cells such as natural killer (NK) cells into the tumour. It has previously been shown that patients whose melanomas have larger numbers of NK cells within them survive, on average, longer than those whose tumours have lower levels of NK cells.

"This work really emphasises the importance of computational biology in furthering our understanding of cancer biology and patient outcomes."

NK cells could be detected in melanoma tumours by their unique patterns of gene expression, said Dr Cursons.

"Using computational biology, we discovered a group of 20 NK cell genes that were expressed at different levels across samples of metastatic melanoma. Excitingly, this 'NK gene signature' correlated with the survival rate of these patients: patients with a high expression level of these NK genes survived, on average, longer than those patients with low levels of the gene signature. This reinforces the role of NK cells as key melanoma-fighting immune cells," he said.

Improving melanoma therapies

Associate Professor Davis said new classes of immunotherapy drugs were already in clinical use.

"Many of these immunotherapy drugs act by enhancing the anti-tumour effects of immune cells. By quantifying the level of NK cell infiltration in a tumour, the NK gene signature we developed could help to decide how likely a patient is to benefit from immunotherapies," she said.

While the research is not currently available for predicting patient outcomes in a clinical setting, the team hope it could assist in the development and trialling of new approaches to treating metastatic melanoma.

"We hope our research provides a justification for future melanoma clinical trials to routinely include measures of gene expression – an area called transcriptomics – to differentiate groups of patients and how well they may respond to available therapies. This work really emphasises the importance of computational biology in furthering our understanding of cancer biology and patient outcomes," Associate Professor Davis said.

Above: (L-R) Dr Joseph Cursons, Associate Professor Melissa Davis and Dr Fernando Souza-Fonseca-Guimares collaborated to identify a gene signature that could identify the patients who will best respond to treatment.

Mr Huon Wong

Colman Speed Medal: Huon Wong

A supportive and collaborative culture was what drew Mr Huon Wong to join the Institute to undertake an Honours program.

"I attended one of the Institute's Student Open Days. Everyone was really friendly, and there was a variety of interesting projects on offer. I also really liked the role of the student association, WESA, in providing academic and social support," Mr Wong said.

Mr Wong was the winner of the Colman Speed Medal in 2019, awarded to the top Institute Honours student. Since completing his studies, he has joined the Wicks laboratory as a research assistant.

His Honours project, supervised by Associate Professor Sandra Nicholson, looked at proteins that regulate immune responses to cancer.

Mr Wong said he benefited from the Institute's collaborative culture. "Everyone is willing to help one another, which has been great for me. I've learned heaps from the Honours coursework, as well as from people who are passionate about their field of research and been exposed to new scientific ideas," he said.

2019 Graduates

Students are highly valued members of our research groups, and some will go on to become the future leaders of our sector. Our students receive world-class training in medical research and broader career skills, which equips them for a range of careers in the health and medical research sector and other fields.

Congratulations to the following students who successfully completed their studies this year.

Doctor of Philosophy, University of Melbourne

Dr Hesham Abdulla
Associate Professor Matthew McCormack, Professor Warren Alexander, Dr Benjamin Shields
Modelling the multistep pathogenesis of T-cell acute lymphoblastic leukaemia

Dr Casey Ah-Cann
Professor Marnie Blewitt, Associate Professor Marie-Liesse Asselin-Labat, Dr Kate Sutherland, Professor Ben Solomon
Screening for breath: identifying Aurkb as a novel regulator of lung development

Dr Holly Anderton
Professor John Silke, Professor David Vaux, Dr Najoua Lalaoui
Inhibitor of apoptosis proteins (IAPs) and SHARPIN regulate the immune response in the skin to limit inflammation and maintain homeostasis

Dr Marilou Barrios
Dr Ken Pang, Associate Professor Seth Masters
Understanding RNA transport via exosomes and SIDT2

Dr Jonathan Bernardini
Associate Professor Grant Dewson, Associate Professor Paul Ekert, Dr Jamie Fletcher
Regulation of the apoptotic machinery by the E3 ubiquitin ligase Parkin

Dr Roberto Bonelli
Professor Melanie Bahlo, Professor Ivo Mueller
Integration of 'omics data dissects genetic and metabolic drivers of macular telangiectasia type II

Dr Margs Brennan
Associate Professor Marco Herold, Professor Andreas Strasser, Dr Gemma Kelly
The role of HECTD1 and MCL-1 in the regulation of normal and malignant haematopoiesis

Dr Karla Fischer
Professor David Vaux, Dr Anissa Jabbour, Professor Andreas Strasser
Cytokine signalling in haematopoietic cells

Dr Andrew Foers
Professor Ian Wicks, Dr Ken Pang, Professor Andrew Hill
Investigating circulating miRNA markers of response to triple DMARD therapy, and profiling synovial fluid extracellular vesicles in patients with rheumatoid arthritis

Dr Abebe Fola
Associate Professor Alyssa Barry, Professor Ivo Mueller
Exploring *Plasmodium vivax* transmission dynamics and population genetics through genetics and genomics

Dr Wilford Goh
Professor Nick Huntington, Professor Stephen Nutt
The roles of Hhex and Ikzf1 in murine NK cell biology

Dr Zoe Grant
Dr Leigh Coultas, Associate Professor Anne Voss
Mechanisms of angiogenesis in development and disease

Dr Melanie Heinlein
Professor Andreas Strasser, Associate Professor Daniel Gray
Molecular mechanisms of thymic tolerance induction and recovery from involution

Dr Gwo-Yaw Ho
Professor Clare Scott, Professor David Bowtell
Understanding the role of MYCN in ovarian cancer to underpin treatment strategies

Dr Alan John
Associate Professor Ethan Goddard-Borger, Professor Ben Kile
New tools for deciphering the roles of tryptophan C-mannosylation

Dr Dawn Lin
Dr Shalin Naik, Professor Phil Hodgkin
Steady-state and emergency dendritic cell development at a clonal level

Dr Ann Ly
Dr Diana Hansen, Dr Lisa Ioannidis
The transcription factor T-bet in the control of germinal centre dynamics in malaria

Dr Nicole McKenzie
Associate Professor Ethan Goddard-Borger, Associate Professor Chris Burns
Towards the development of fucosyltransferase 8 inhibitors

Dr Simon Preston
Professor Marc Pellegrini, Professor Gabrielle Belz
Defining programs of cell death that can be harnessed to impact on outcomes of chronic viral infection

Dr Pravin Rajesekaran
Associate Professor Justin Boddey, Professor Alan Cowman
Understanding the mechanisms of protein export in *Plasmodium berghei* liver infection

Dr Nenad Sejic
Dr Gemma Kelly, Professor Andreas Strasser
Insights into mechanisms of resistance to apoptosis in Epstein-Barr virus-associated T and NK cell lymphomas

Dr Jessica Tempany
Dr Vanessa Bryant, Professor Phil Hodgkin
Measuring B-lymphocyte responses in human health and primary immunodeficiency

Dr Yanhui Xu
Professor Len Harrison, Professor Yuxia Zhang, Associate Professor Tim Thomas, Dr Naiara Garcia Bediaga
Regulation of human T-cell function by short-chain fatty acids

Master of Philosophy, University of Melbourne

Ms Ashleigh Kropp
Associate Professor Isabelle Lucet, Dr Onisha Patel
Structural and functional characterisation of the molecular assembly of two pseudokinase scaffolds

Master of Research, University of Melbourne

Ms Shuang Hu
Professor Ivo Mueller, Associate Professor Aaron Jex, Dr Boris Reljic, Dr Sarah Charnaud
Identifying *Plasmodium vivax* encoded proteins that may prevent host cell death during liver development

Mr Mingjie Luo
Professor David Huang, Professor Phil Hodgkin, Professor Terry Speed
Determining the apoptotic threshold for BH3-mimetic therapy.

Bachelor of Science (Honours) or Bachelor of Biomedicine (Honours), University of Melbourne

Mr Ben Broomfield
Dr Joanna Groom, Dr Verena Wimmer
Dissecting the induction of migration cues during infection.

Ms Yasmine Dai
Associate Professor Ethan Goddard-Borger, Dr Sayali Shah
Optimisation of chemical probes to understand the biological roles of tryptophan C-mannosylation.

Ms Jing Deng
Associate Professor Joan Heath, Dr Karen Doggett
Exploitation of an essential RNA-processing mechanism for cancer therapy.

Ms Serena Kane
Professor Tony Burgess, Dr Maree Faux
Proliferation and differentiation capacities of enriched colonic stem cells in organoid culture.

Mr Wil Lehmann
Dr Emma Petrie, Associate Professor James Murphy
Mechanism for viral inhibition of necroptosis.

Ms Phoebe McDonald
Dr Kelly Rogers, Dr Niall Geoghegan, Professor Alan Cowman
Calcium signalling during invasion of erythrocyte by *Plasmodium falciparum*.

Ms Erya Ni
Dr Anna Coussens, Dr Alan Yu
Tuberculosis traps: dissecting the mechanisms of *Mycobacterium tuberculosis*-induced NETosis in human neutrophils.

Ms Komal Patel
Dr Tracy Putoczki, Dr Gabriela Brumatti
Understanding the role of interleukin-11 in acute myeloid leukaemia.

Mr Lachlan Richardson
Dr Brad Sleebs, Professor Alan Cowman, Dr Trent Ashton
Investigation of substrate specificity and cleavage by the *Plasmodium* protease plasmepsin X.

Mr Harley Stiebel
Dr Sant-Rayn Pasricha, Dr Leila Larson
Investigating the association between anaemia and infant auditory sensory memory – an electrophysiology study.

Mr Antoine Terreaux
Associate Professor Emma Josefsson, Dr Samir Taoudi, Dr Diane Moujalled
Investigating reduced metabolic function in ageing platelets.

Mr Huon Wong
Associate Professor Sandra Nicholson, Associate Professor Jeff Babon
Investigating the function and regulation of the cytokine-inducible SH2-containing protein.

Ms Teresa Yuwono
Professor Guillaume Lessene, Dr Christoph Grohmann
Synthesis and application of chemical probes towards identifying the target protein of anti-cancer small molecule WEHI-7326.

Patents granted in 2019

Patents protect unique inventions made by Institute scientists. These facilitate Institute collaboration with commercial organisations to progress the development of new products, a key step towards clinical translation.

Patents ensure that the Institute is able to leverage its intellectual property for future financial benefits. Income received for commercial exploitation of Institute intellectual property is then used to invest in further research and reward the researchers who contributed to the invention.

Apoptosis-inducing agents for the treatment of cancer and immune and autoimmune diseases (1)

Inventors: M Bruncko, P Colman, P Czabotar, Y Dai, H Ding, G Doherty, L Hasvold, L Hexamer, A Kunzer, G Lessene, R Mantei, W McClellan, S Moore, C Park, C-M Park, A Petros, X Song, A Souers, G Sullivan, Z-F Tao, G Wang, L Wang

China, India, Malaysia, Peru

Apoptosis-inducing agents for the treatment of cancer and immune and autoimmune diseases (2)

Inventors: M Bruncko, H Ding, G Doherty, S Elmore, T Hansen, L Hasvold, L Hexamer, A Kunzer, R Mantei, X Song, A Souers, G Sullivan, Z-F Tao, G Wang, L Wang, X Wang, M Wendt

Brazil, Costa Rica, Greece, Gulf Cooperation Council, Ireland, South Korea, South Korea, Uruguay

Bak binding proteins

Inventors: A Alsop, K Anwari, G Dewson, S Iyer, R Kluck

Australia, US

Barley with low levels of hordeins

Inventors: G Tanner, C Howitt

Japan, US

Dendritic cell marker and uses thereof

Inventors: I Caminschi, M Lahoud, A Lew, A Proietto, K Shortman, M Wright, L Wu

Canada

Method of treating intracellular infection

Inventors: C G Begley, G Ebert, M Pellegrini

US

Novel anti-cancer agents

Inventors: T Burgess, G Lessene, F Walker, K Watson, H Witchard

South Korea

Protein kinase inhibitors and methods of treatment

Inventors: J Baell, T Burgess, G Lessene, H Maruta

Canada

Soluble mediator

Inventors: E Bandala Sanchez, J Dromey, L Harrison, M Rashidi, Y Zhang

Belgium, France, Great Britain, Greece, Hong Kong, Ireland, Italy, Latvia, Lithuania, Luxembourg, Portugal, Republic of Croatia, Spain, Sweden, The Netherlands, US (x2)

Structure of insulin in complex with N- and C-terminal regions of the insulin receptor alpha-chain

Inventors: M Lawrence, J Menting, B Smith

Australia

A REMARKABLE PLACE

The Institute first participated in Open House Melbourne in 2013. Since then, thousands of members of our community have toured the Institute as part of the event, which celebrates the architecture and vibrancy of our city. Our participation is made possible by our staff and students, who volunteer to run tours throughout the event, sharing the Institute's past, present and future with the public.

A remarkable place: laying the path to our success

2019 was an exciting time for the Institute, as we embarked on implementing our *Strategic Plan 2019-2023*.

Implementing our strategic plan

Over the past year, we have commenced delivering the strategic plan that enables the Institute to continue its leadership in basic and translational research in a complex and changing world.

The establishment of our five research themes and strategic goals ensures we have the critical mass to undertake ambitious discovery research and address health priority goals, and that our translational links are robust enough to effectively take our discoveries to the clinic to improve health.

The Strategic Cabinet, formed at the end of 2018, is leading the delivery of the *Strategic Plan 2019-2023*. The cabinet, composed of leaders from across the Institute, is also responsible for delivering the Institute's scientific strategy. The Strategic Cabinet and thematic alignments will concentrate the Institute's efforts to areas of greatest impact, facilitating collaboration across the research themes, and leading the Institute's engagement to tackle major research problems.

In 2019, the Strategic Cabinet began to chart the Institute's course, with technology, computational biology and translation as key enablers to our direction. A number of scientific strategic projects are coming to fruition. These include the delivery of the National Drug Discovery Centre (p8), development and delivery of a biologics initiative and building on our capabilities in healthy ageing research.

Creating a vibrant Institute

Building a vibrant and supportive workplace is a key part of our Strategic Plan.

In 2019, the Attracting and Developing Exceptional People (ADEPt) project facilitated the introduction of an annual career planning and development process for scientific staff and students. To support career development, the Institute's Scientific Capability Framework was introduced, defining excellence in each scientific role. An interactive web-based scientific career pathways model was introduced, describing careers outside of the traditional academic pathway, within the Institute, industry and the university sector. This model highlights fields and roles where scientific qualifications are of advantage and describes the steps required to move into the roles. Users can access interviews with Institute alumni working in these areas, and also the details of alumni members to contact for career advice. To further support career development, an online development guide was introduced aligning internal and external development opportunities with the Institute's Scientific Capability Framework.

The employee development program for 2019 delivered workshops allowing staff to build their skills in non-technical areas such as conflict resolution, effective feedback, coaching, safe workplace culture, and managing mental health.

The Institute's second Health and Wellbeing Program commenced in July 2019. Running over an 18-month period, each quarter of the 2019/20 Health and Wellbeing Program focuses on a set theme designed to promote the health and wellbeing of Institute staff and students.

The 'healthy foundations' quarter saw the Institute recruit 14 staff members to become wellbeing contact officers for their peers. The wellbeing contact officers have received mental health first aid, contact officer and family and domestic violence training to assist them in being a point of contact and triage for their peers for issues of concern.

On-site courses and workshops, including meditation and mindfulness, were made available for the 'managing life and work' quarter. These were enthusiastically taken up, with strong participation from our staff and students. Key messages about the Institute's family-friendly working hours and parental leave provisions were also communicated through program announcements. The program will continue to run through 2020.

Entrepreneurship Program

The Entrepreneurship Program establishes an active and supportive space at the Institute for all staff and students to advance their professional development.

This program focuses on spinout creation and incubation, opening new career pathways and attracting entrepreneurial staff to the Institute. The long-term goal is the formation of new spinout companies to enable commercialisation of a greater range of Institute intellectual property than could be achieved by solely licensing technologies to existing companies.

The Entrepreneurship Program offered a series of workshops, masterclasses and an all-day intensive, available for varying levels of experience, to staff and students in 2019. Approximately 10 per cent of the Institute participated in the project's pilot Education and Awareness program, which received excellent feedback. A new seminar series, Startup Q&A, was also launched to raise awareness more broadly, encourage networking and create a community across the precinct.

Prior to the 2019 education program, the Business Development Office was aware of three potential new ventures. Since commencement of the program, participants have shared a further seven startup/spinout ideas – from microfluidic platforms to clinical trial support – and an additional four very early-stage ideas. This increase illustrates that the Institute is starting to develop a more entrepreneurial culture.

Program participants found the initial program was valuable. "It was a great overview of how to shift to a more entrepreneurial mindset with easy-to-implement strategies, presented in a concise and engaging manner," said one participant.

Taking notebooks online

As we advance our research, we need to ensure our platforms and service support enhance this growth.

In 2019, we introduced electronic lab notebooks for all our researchers, allowing them to conveniently access their lab notes from anywhere in the world, in a secure and compliant manner. The electronic lab notebooks support our researchers in making discoveries in a digital era and are facilitating greater collaboration with peers.

The Research Support Program delivered the project, with a focus on the needs of researchers. Training opportunities and ongoing in-house support helped make the transition from paper to electronic seamless and over the first few months researchers made more than 100,000 entries on their electronic lab notebooks.

Implementing new business platforms

The Institute's key business systems for Finance, Procurement and Payroll are integrated on an ageing platform, with extended license support agreements that are scheduled to expire in 2020. The current state environment carries significant risk to the Institute as the systems become increasingly unviable from a reliability, risk and security perspective.

A business case for the implementation of an Enterprise Resource Planning (ERP) system was developed and endorsed in 2019. Workday was selected as the Institute's ERP provider and in 2020, we will transition to the Workday Human Capital Management, Finance and Procurement ERP system and integrated Payroll solution.

The new systems and associated process changes will provide significant efficiency gains and improved service delivery capability. The investment in improving our core business systems will also deliver an improved user experience and free up resources and time for staff, enabling researchers to spend more time on research and allowing professional services staff to provide more value-added services.

Engaging with our community

At the Institute, engagement and advocacy for medical research in the community is an important goal. In 2019, we had almost 8000 people who visited the Institute or took part in Institute events.

Our annual *Art of Science* exhibition saw more than 3000 visitors engage with striking images created by our researchers as part of their work. The exhibition, held annually in Melbourne's Federation Square, was launched and winners chosen by our special guest judge Mr Nate Byrne, from ABC News Breakfast. After the exhibition closed, an Institute-branded display of 2019 *Art of Science* finalists was featured on an outdoor screen in the middle of Federation Square, passed by more than 35,000 people each day. *Art of Science* also selected as a finalist in the 2019 Melbourne Awards, presented by the City of Melbourne, for its contribution to health promotion.

The Institute also participated for the sixth time in Open House Melbourne in July 2019. More than 370 people visited, an increase on 2018, and 35 staff and students from across the Institute volunteered to host tours and activities as part of the event.

Above: Business Development Office (BDO) interns with BDO staff. The BDO Internship Program offers staff the opportunity to increase their understanding of innovation, intellectual property management and commercialisation.

Staying connected with our alumni

Our alumni are some of the Institute's best ambassadors, and an important part of the Institute community.

Our past staff and students have always played an important role in the life of the Institute.

The Institute's alumni relations program is dedicated to staying connected with our alumni community. In addition to providing an opportunity to engage with the ongoing work of the Institute, it also offers alumni the chance to make new acquaintances, rekindle old friendships and share Institute memories.

Alumni-focused engagement

Through tailored communications, reunions and other activities, our alumni program helps alumni reconnect with old colleagues and keep up to date with the latest Institute news and activities. We also hope that in the long term our alumni build goodwill for the Institute in the wider community and support our broader research activities.

> *"It was great being part of the WEHI community again and feeling like I am still part of the Institute family."*

Throughout 2019, the alumni program ran a series of reunions – including dinners in Sydney, Australia; Munich, Germany; Boston, US; and Beijing, China.

An alumnus attendee at the Sydney reunion said it was a great connection with the Institute. "It was great being part of the WEHI community again and feeling like I am still part of the Institute family," she said.

We also hosted a reunion for alumni who worked at the Institute in the 1990s, and a career speed-dating event that matched students and postgrads with selected alumni. An attendee at the career speed-dating event found it inspiring to see the passion of the Institute attendees.

"I enjoyed interacting with enthusiastic postdocs and students, who had obviously spent time thinking of things they wanted to ask us," he said.

Our alumni receive a special alumni-focused edition of the Institute's quarterly newsletter, *Illuminate*. They can also engage with the Institute on a dedicated Facebook group, and receive email updates on key activities including the Annual General Meeting, annual report and our *Art of Science* exhibition.

With the recruitment of more than 200 new alumni to the network in 2019, and an increase in event attendance, our alumni program has matured into a key aspect of the Institute's community engagement.

Above: Participants in the alumni career speed-dating event.

Pairing researchers and consumers to drive research forward

Connecting with members of the community helps researchers make discoveries that improve human health.

The Consumer Buddy Program is now in its seventh year and is embedded throughout all Institute themes. The number of consumers involved in the program in 2019 increased to a total of 68 with new disease areas including Parkinson's disease and dementia requesting participation.

> *"The buddy program at the Institute is unique and invaluable. Getting to know George – and his story – has inspired me and my work."*

Researchers involved in the program in 2019 continue to work with their 'consumer buddies', some in relationships now for six years. Consumers by Institute definition are people who have been impacted by a disease, either through a diagnosis or as a caregiver, or are members of the community who have a strong interest in medical research.

Valuable knowledge

Consumers have valuable knowledge of the practical, social, physical and emotional effects of the medical condition on themselves, their families and friends and on the broader community. Having regular contact with their matched researcher influences and enhances research at the Institute and provides a powerful voice for the communication of scientific and research issues to the community.

Dr Gabriela Brumatti, a blood cancer researcher, said she and her consumer buddy George have a great relationship.

"I've worked at institutes around the world but the buddy program at the Institute is unique and invaluable. George has been so open and willing to share his experiences. Getting to know George – and his story – has inspired me and my work," she said.

Becoming a consumer buddy

The Institute is keen to recruit new consumers to work alongside our inspiring scientists and become part of the Consumer Buddy Program.

Consumers do not need to have a science background. Consumer buddies meet regularly with their paired researcher for project updates, and the time commitment is flexible, with support and appropriate training provided by the Institute.

Below: Consumer buddy George (left) works with blood cancer researcher Dr Gabriela Brumatti as part of the Institute's consumer buddy program.

Diversity and inclusion

For all our people to thrive, it is vital that we create a workplace where everyone feels able to be their true, authentic self.

Our strategic goal *Attract, Develop, Flourish* has a commitment to diversity and inclusion at its core. In 2019, the Institute continued to embed and expand its commitment to diversity and inclusion across all its activities and maintained specific focus in the areas of gender equality, reconciliation and LGBTQIA+ inclusion.

Gender equality in action

Our renewed Gender Equality Committee commenced in 2019, co-chaired by Dr Joanna Groom and Dr James Vince, and has a membership that includes several faculty members. The committee took over responsibility for overseeing the implementation and evaluation of the Institute's four-year Gender Action Plan (GAP) that was developed as part of the application for the SAGE Athena SWAN award in 2018.

The Institute's GAP provides a roadmap to gender equality at the Institute. Several key actions were undertaken in 2019 including a de-identified recruitment trial and a focus on improving accountability and transparency through monitoring and reporting on key metrics such as recruitment and promotion to help us understand and track our progress on gender equality.

The Institute was honoured to welcome influential academic Professor Marcia Langton AM to deliver our inaugural International Women's Day address in March 2019.

Professor Langton is a highly respected public intellectual, and since 2000 has held the Foundation Chair of Australian Indigenous Studies at the University of Melbourne. Speaking to a full auditorium of Institute staff and students, Professor Langton delivered a powerful speech on the status of Aboriginal and Torres Strait Islander women in Australia.

Collaborating for impact

Institute staff and students are part of a number of programs aimed at achieving gender equality across our Institute, our sector and our community.

The Institute was in the first cohort of institutions to receive a bronze award in 2018 for its commitment to gender equality under the Science in Australia Gender Equity (SAGE) pilot program founded by the Australian Academy of Science and the Australian Academy of Technology and Engineering.

The Institute is now one of 45 Australian higher education and research sector institutions who have completed the SAGE pathway to accreditation by committing to advancing the careers of women, trans and gender-diverse individuals in science, technology, engineering, maths and medicine (STEMM) disciplines.

Professor Doug Hilton is a member of the Male Champions of Change national 2015 group, made up of Victorian-based leaders representing some of Australia's most significant local, national and international organisations. Their goal is to improve the representation of women in leadership positions and in non-traditional roles in their organisations.

The Institute is a member of Women in Science Parkville Precinct, a local collective working to achieve gender equity across five medical research institutes in the Parkville biomedical precinct. Along with regular seminars and discussion forums promoting women in science, the initiative is collating data across the five participating institutes to measure the impact of gender equity activities.

The Gender Action Plan (GAP) is the road map to gender equality at the Institute

Supporting and advancing women's careers

Career development for academic staff

Flexible working and managing career breaks

Organisation and culture

Supporting trans and gender-diverse people

Intersectionality (supporting minority women)

Aboriginal and Torres Strait Islander peoples' representation

Supporting our LGBTQIA+ community

The Institute continued to support the employee-led WE-Pride LGBTQIA+ network in 2019.

The Institute was well represented at the Midsumma Pride March, with Professors Doug Hilton and Alan Cowman leading the charge as ally supporters.

WE-Pride produced a Q&A-style video in which our rainbow community answered questions from staff and students about LGBTQIA+ experiences. The video was launched at our celebration of Wear it Purple Day. WE-Pride also hosted a film night, helped guide policy development, provided peer support to LGBTQIA+ staff and students, and worked closely with the Parkville precinct's QueersInScience network.

As part of our GAP, training on LGBTIQA+ inclusion was offered to staff and students in partnership with the local organisation Transgender Victoria.

The Institute is delighted to act as the host organisation for QueersinScience, an initiative that provides support for LGBTQIA+ people working in STEMM. The Institute offers infrastructure and a range of in-kind support across our professional services functions.

Below: Members and allies of the Institute's LGBTQIA+ community.

Reconciliation

A strong focus for 2019 was on providing opportunities for staff and students to reflect on Australia's colonial history through truth-telling.

We continued to work to increase awareness and understanding of Aboriginal and Torres Strait Islander history, knowledge and culture. Two new co-chairs of the Reconciliation Committee were appointed in 2019. Associate Professor Sant-Rayn Pasricha and Dr Tracy Putoczki took over leadership of the committee which is charged with shaping the future direction of our reconciliation agenda.

National Reconciliation Week and NAIDOC week

National Reconciliation Week focused on the need for the relationship between the broader Australian community and Aboriginal and Torres Strait Islander Peoples to be grounded in truth. The Institute sought to play its part by inviting staff to discover new and old truths, most powerfully through the display of two maps showing the locations of known massacre sites where Aboriginal people were killed by European settlers. The Institute also hosted colleagues from the University of Melbourne for a special two-part seminar. First Nations women Dr Ngaree Blow and Zena Cumpston posed the question *'Grounded in Truth: Who's truths are we really telling?'* This was followed by Dr Kenneth Winkel, who spoke on lessons from Donald Thomson's *'Venomous Encounter'*.

The Institute was delighted to welcome Associate Professor Duane Hamacher from the University of Melbourne to give a seminar during NAIDOC week. Associate Professor Hamacher's lecture focused on the concept of truth-telling – acknowledging and discussing the complexity of Aboriginal and Torres Strait Islander knowledge of the stars to reconsider the ways we think about orality, science, and the history of knowledge. Staff and students were also invited to celebrate NAIDOC week by joining First Nations artist Emrhan Tjapanangka Sultan for an interactive workshop *Cultural Journey Through Art*.

Supporting and enabling our people

In its sixth year, the Institute's partnership with the CareerTrackers Indigenous Internship Program is going from strength to strength. The initiative offers multi-year internships to undergraduate Aboriginal and Torres Strait Islander university students. The program provides an opportunity to build the pipeline to increase the number of Aboriginal and Torres Strait Islander people working in scientific research. The Institute is also excited to be growing our involvement in the Aurora Internship Program by offering four- to six-week placements for Aboriginal and Torres Strait Islander interns.

The Institute's first cultural leave policy was launched to assist Aboriginal and Torres Strait Islander employees to fulfil their distinct cultural obligations.

The Institute partnered with the Koorie Heritage Trust to deliver a range of cultural learning activities including the Institute's first cultural awareness training program. Sessions were held with staff across the Institute on topics including identity, culture and the impact of colonisation. Staff and students also participated in guided walking tours along Birrarung (the Yarra River), and learnt more about the rich historical significance of our local area for Aboriginal and Torres Strait Islander Peoples.

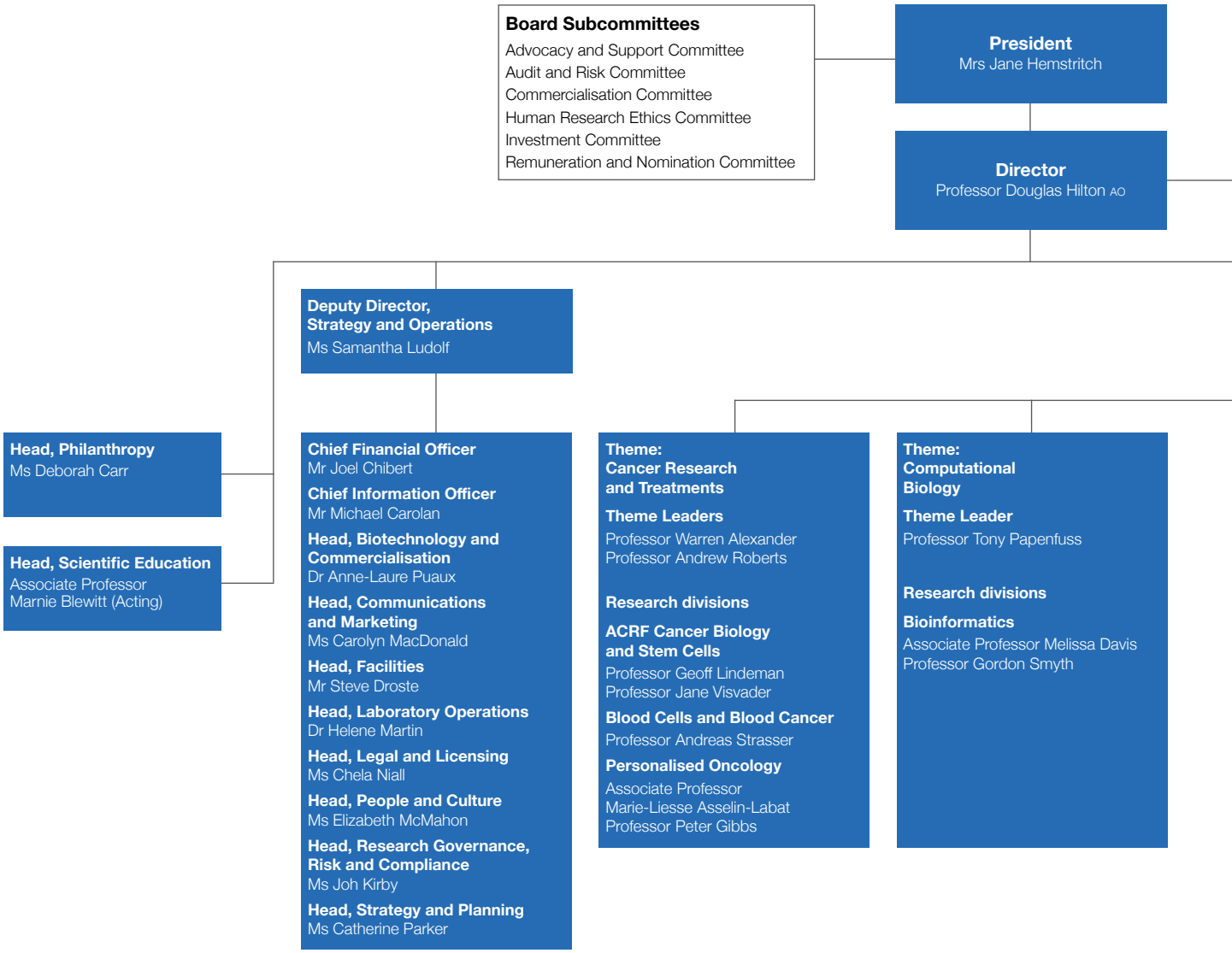
Above: Ms Bridget Dorizzi, one of our five CareerTrackers students, is a descendant of the original people of Trowernna (Tasmania) and a proud member of the Lia Pootah Aboriginal community.

ORGANISATION AND GOVERNANCE

Dr Judith Slocombe AM (left), pictured with Cancer Research and Treatments Theme Leader Professor Andrew Roberts, chairs the Institute's Consumer Advisory Panel.

The panel's mission is to connect the Institute's research with community experiences of disease and consumer expectations. This is achieved by involving medical, health and research consumers in our scientific research, and enabling our researchers and consumers to form productive working relationships.

Institute organisation 31 December 2019



List of Laboratory Heads

ACRF Cancer Biology and Stem Cells
Associate Professor Emma Josefsson
Professor Geoff Lindeman
Professor Clare Scott
Dr Kate Sutherland
Professor Jane Visvader

ACRF Chemical Biology
Associate Professor Ethan Goddard-Borger
Professor Guillaume Lessene
Associate Professor Isabelle Lucet
Dr Brad Sleebs

Advanced Technology and Biology
Dr Kym Lowes
Dr Jeff Mitchell
Mr Simon Monard
Dr Kelly Rogers
Associate Professor Andrew Webb
Dr Stephen Wilcox
Ms Kaye Wycherley

Bioinformatics
Associate Professor Melissa Davis
Professor Tony Papenfuss
Associate Professor Wei Shi
Professor Gordon Smyth
Professor Terry Speed

Blood Cells and Blood Cancer
Professor Jerry Adams
Professor Warren Alexander
Professor Suzanne Cory
Associate Professor Marco Herold
Professor Douglas Hilton
Professor David Huang
Dr Gemma Kelly
Associate Professor Ruth Kluck
Associate Professor Ian Majewski
Professor Nick Nicola
Professor Andreas Strasser
Professor Andrew Roberts

Clinical Translation
Professor Clare Scott
Professor Ian Wicks

Epigenetics and Development
Associate Professor Marnie Blewitt
Dr Leigh Coultas
Associate Professor Joan Heath
Associate Professor Matthew Ritchie
Dr Samir Taoudi
Associate Professor Tim Thomas
Associate Professor Anne Voss

Management Committees

Animal Ethics Committee
Appointment and Promotion Review Committee
Biosafety Committee
Clinical Translation Standing Committee
Diversity and Inclusion Committee
Education Committee
Engagement Committee
Faculty Recruitment and Appointment Committee
Gender Equity in Science Committee
Health and Safety Committee
IT Governance Committee
Project Governance Committee
Reconciliation Committee
Risk Management Committee
Senior Technology Planning Group
Strategic Cabinet

Deputy Director, Science Strategy
Professor Alan Cowman AC

Deputy Director, Science Integrity and Ethics
Professor David Vaux AO

Theme: Infection, Inflammation and Immunity

Theme Leader
Professor John Silke

Research divisions

Immunology
Associate Professor Daniel Gray
Professor Phil Hodgkin

Infectious Diseases and Immune Defence
Professor Marc Pellegrini
Associate Professor Wai-Hong Tham

Inflammation
Associate Professor James Murphy

Theme: Healthy Development and Ageing

Theme Leader
Professor Melanie Bahlo

Research divisions

Epigenetics and Development
Associate Professor Marnie Blewitt
Associate Professor Anne Voss

Population Health and Immunity
Professor Ivo Mueller
Associate Professor Sant-Rayn Pasricha

Ubiquitin Signalling
Professor David Komander

Theme: New Medicines and Advanced Technologies

Theme Leader
Professor Guillaume Lessene

Research divisions

ACRF Chemical Biology
Associate Professor Isabelle Lucet

Advanced Technology and Biology
Dr Kelly Rogers

Structural Biology
Associate Professor Matthew Call
Associate Professor Peter Czabotar

Clinical Translation
Professor Clare Scott
Professor Ian Wicks

Colonial Foundation Healthy Ageing Centre
Associate Professor Andrew Webb

National Drug Discovery Centre
Dr Jeff Mitchell

Immunology
Associate Professor Rhys Allan
Professor Gabrielle Belz
Dr Vanessa Bryant
Associate Professor Daniel Gray
Dr Joanna Groom
Associate Professor Edwin Hawkins
Professor Phil Hodgkin
Dr Misty Jenkins
Professor Andrew Lew
Dr Shalin Naik
Professor Stephen Nutt
Associate Professor Jason Tye-Din

Infectious Diseases and Immune Defence
Associate Professor Justin Boddey
Professor Alan Cowman
Dr Anna Coussens
Dr Diana Hansen
Professor Marc Pellegrini
Associate Professor Wai-Hong Tham
Associate Professor Chris Tonkin

Inflammation
Dr Philippe Bouillet
Associate Professor Seth Masters
Associate Professor James Murphy
Associate Professor Sandra Nicholson
Professor John Silke
Professor David Vaux
Dr James Vince
Professor Ian Wicks

Personalised Oncology
Associate Professor Marie-Liesse Asselin-Labat
Professor Tony Burgess
Professor Peter Gibbs
Dr Tracy Putoczki
Associate Professor Oliver Sieber
Associate Professor Ian Street

Population Health and Immunity
Professor Melanie Bahlo
Professor Len Harrison
Associate Professor Aaron Jex
Professor Ivo Mueller
Associate Professor Sant-Rayn Pasricha
Associate Professor Leanne Robinson
Associate Professor Rosie Watson
Associate Professor Nawaf Yassi

Structural Biology
Associate Professor Jeff Babon
Associate Professor Matthew Call
Dr Melissa Call
Professor Peter Colman
Associate Professor Peter Czabotar
Dr Jacqui Gulbis
Professor Mike Lawrence

Ubiquitin Signalling
Associate Professor Grant Dewson
Dr Rebecca Feltham
Professor David Komander
Dr Berhard Lechtenberg

Walter and Eliza Hall Institute Board

The directors of the Walter and Eliza Hall Institute of Medical Research Board
31 December 2019

WEHI Board members 2019 (L-R): Mr Terry Moran, Ms Marie McDonald, Mr Peter Collins, Professor Shitij Kapur, Professor Sir John Savill, Mrs Jane Hemstritch, Mr John Dyson, Professor James McCluskey, Mr Robert Wylie, Associate Professor Pippa Connolly, Mr Malcolm Broomhead. Not present: Professor Christine Kilpatrick and Ms Carolyn Viney.

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BSc (Hons) *London University*
FICAEW FICAA FAICD

Appointed: October 2013
Appointed President: May 2019

Vice President
Mr Terry Moran AC
BA (Hons) *LaTrobe*

Appointed: November 2013
Appointed Vice President: May 2019

Honorary Treasurer
Mr Robert Wylie
FCA FAICD

Appointed: April 2014
Appointed Honorary Treasurer: April 2014

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BE (Civil) MBA *UQ* FIE (Aus) FAusIMM FAIM MICE (UK) FAICD

Appointed: July 2014

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BA (Hons) *Melbourne* BTheology *MCD* Masters *Oxford and HEC Paris*

Appointed: May 2018

Associate Professor (Practice) Pippa Connolly
MEng *Leeds* GAICD CPEng FIEAust

Appointed: April 2019

Mr John Dyson
BSc *Monash* Grad Dip Fin Inv SIA MBA *RMIT*

Appointed: May 2016

Professor Shitij Kapur
MBBS *AIIMS* PhD *Toronto* FRCPC FMedSci

Appointed: May 2017

Professor Christine Kilpatrick
MBBS MBA MD DMedSci (Hons) *Melbourne* FRACP FRACMA FAICD FAHMS

Appointed: May 2017

Professor James McCluskey AO
BMedSc MBBS MD *UWA* FRACP FRCPA FAA FAHMS

Appointed: April 2011

Professor Sir John Savill
BA *Oxford* MBChB *Sheffield* PhD *London* FRCP FRCPE FRCSEd (Hon) FRCPCH(Hon) FASN FRSE FMedSci FRS

Appointed: June 2018

Mr Christopher W Thomas AM
BCom (Hons) MBA *Melbourne* FAICD

Appointed: February 2001
Appointed President: February 2013
Retired from Board: May 2019

Ms Marie McDonald
BSc (Hons) LLB (Hons) *Melbourne*

Appointed: October 2016

Ms Carolyn Viney
LLB/BA *Monash*

Appointed: December 2016

Full biographies of Institute board members and key governance documents can be found at wehi.edu.au/about-structure/governance/board.

Members of the Institute to 31 December 2019

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University of Melbourne
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Emeritus Professor Robin Anders
Professor James Angus AO
Mr Donald Argus AC
Mr Barry Axtens
Mr Paul Barnett
Ms Helen Barry
Mrs Ann Bates
Mr Robert Bates
Mr Lance Bauer
The Walter and Eliza Hall Trust
Dr Elsmaree Baxter
Dr Glenn Begley
Professor Claude Bernard
Mr Marc Besen AC
Dr Gytha Betheras AM
Professor Rufus Black
Mr Malcolm Broomhead AO
Professor Graham Brown AM
Mrs Rosalind Brown
Mrs Beverley Brownstein
Dr Gerard Brownstein
Mrs Sally Bruce
Mr Ian Brumby
Mr John Brumby AO
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Professor Tony Burgess AC
Professor Christopher Burrell AO
Mr Greg Camm
Mr Terry Campbell AO
Kate Cannon
Mr Saul Cannon
Mrs Gill Carter
Mr Pat Cashin
Mr John Chatterton AM
Dr Julian Clark
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Mrs Jacqui Cooper
Associate Professor Paul Cooper
Mr Glenn Corke
Mr Ian Coulson
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Mrs Joan Curtis
Dr Andrew Cuthbertson AO
Mr John Dahlsen
Mr Stephen Daley
Mrs June Danks
Mrs Annette Davis
Mr Leon Davis AO
Ms Liz Dawes
Dr Simon de Burgh
Professor David de Kretser AC
Professor John Denton
Mrs Liz Dexter
Mr Mick Dexter
Mr Angelo Di Grazia
Mrs Helen Diamond
Ms Melda Donnelly
Professor Ashley Dunn
Mr John Dyson
Ms Roz Edmond
Mr Garry Emery
Dr Peter Eng
Professor Sir Marc Feldmann
Mr Michael Fitzpatrick AO
Mrs Pauline Flanagan
Dr Sue Forrest
Professor Richard Fox
Mrs Nolene Fraser
Mr Paul Fraser
Professor Ian Frazer AC
Mrs Pam Galli AO
Ms Kelli Garrison
Dr Andrew Gearing
Ms Louise Gehrig
Mr Barry Gilbert
Mrs Janet Gilbertson
Mr Peter Gilbertson
Ms Rose Gilder
Professor James Goding
Mr Charles Goode AC
Dr Gareth Goodier
Mrs Andrea Gowers
Mr John Grace
Mrs Maureen Grant
Mr Tony Gray
Sir Andrew Grimwade CBE
Mrs Jean Hadges
Col Tom Hall CVO, OBE
Professor Emanuela Handman
Mr Michael Harris
Mr Harry Hearn AM
Mrs Jane Hemstritch
Professor David Hill AO
Mrs Janet Hirst
Mr Darvell Hutchinson AM
Mr Jon Isaacs
The Walter and Eliza Hall Trust
Mr Murray Jeffs
Mr Jose Jimenez
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Professor Shitij Kapur
Ms Helen Kennan
Mr Rowan Kennedy
Mrs Margot Kilcullen
Mr Rob Kilcullen
Professor Christine Kilpatrick AO
Emeritus Professor Frank Larkins AM
Professor Richard Larkins AC
Mrs Belinda Lawson
Mr Gary Liddell
Dr Rowena MacKean OAM
Dr Alex Macphee
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Mr John Marshall AM
Ms Josephine Marshall
Emeritus Professor Jack Martin AO
Mr Erich Mayer AM
Mrs Netta McArthur
Dr Neville McCarthy AO
Professor James McCluskey AO
Ms Marie McDonald
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Professor Kathryn McPherson
Professor Frederick Mendelsohn AO
Mrs Johanna Metcalf

Ms Kate Metcalf
Emeritus Professor Jacques Miller AC
Professor John Mills AO
Mr Robert Minter
The Walter and Eliza Hall Trust
Professor Christina Mitchell
Dr Graham Mitchell AO
Dr Judith A Mitchell
Mr Barry Moore
Mr Terry Moran AC
Ms Barbara Morgan
Mr Hugh Morgan AC
Dr George Morstyn
Mr John Murphy
The Walter and Eliza Hall Trust
Mr Tony Murphy
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Dr Leslie Norins
Mrs Rainey Norins
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Ms Maureen O'Keefe
Mr Bill O'Shea
Professor David Penington AC
Emeritus Professor Roger Pepperell
Ms Gayle Petty
Emeritus Professor Jim Pittard AM
Lady Primrose Potter AC
Mr John Prescott AC
Mr John Pye
Mrs Edith Qualtrough
Mrs Cathy Quilici
Mr Denis Quilici
Professor Peter Rathjen
Ms Kate Redwood AM
Mr John Reid AO
Mr Dieter Rinke
Associate Professor Ken Roberts AM
Ms Linda Rodger
Mrs Mary Rodger
Mrs Margaret Ross AM
Mr Fergus Ryan
Professor Graeme Ryan AC
Mr Colin Sakinofsky
Professor Nick Samaras
Mrs Pam Sargood
Mr Keith Satterley
Professor Sir John Savill
Professor Carl Schedvin
Ms Anne Schumacher
The Walter and Eliza Hall Trust
Ms Carol Schwartz AM
Dr Roland Scollay
Mr Andrew Scott
Professor John Scott AO
Dr Paul Scown
Mrs Sam Sharman
Ms Deborah Sims
Mrs Lousje Skala
Mr Steven Skala AO
Professor Stephen Smith
Mr Jack Smorgon AO
Mr Robert Smorgon AM
Mrs Sally Speed
Professor Terry Speed
Miss Ann Sprague
Mr Geoffrey Stewardson
Dr John Stocker AO
Ms Jenny Strangward
Mr John Stratton
Ms Kate Summers
Ms Helen Sykes
Ms Jenny Tatchell
Mr Bruce Teele
Mrs Cheryl Thomas
Mr Chris Thomas AM
Ms Carolyn Viney
Mr John Walker QC
Mr Stanley Wallis AC
Mr Peter Walsh
Ms Catherine Walter AM
Mr John Walter
Mr John Warburton
Mr Robert Warren
Mrs Catherine Watt
Ms Marion Webster OAM
Mr Kevin Weight
Professor Richard Wettenhall
Dr Senga Whittingham
Mr David Williamson
Mr Malcolm Williamson
Professor Robert Williamson AO
Professor Ingrid Winship
Ms Sally Wood
Mr Peter Worcester
Mr Rob Wylie

The Institute remembers those members who have passed away

Mr Robert Evans
Dr Margo Honeyman
Dr Thomas Hurley AO OBE
Emeritus Professor Ian Mackay AM
Mr Roger Male
Professor Ray Martin AO
Mr Bob Munro
Sir Arvi Parbo AC
Mr Michael Robinson AO

The Walter and Eliza Hall Institute acknowledges the support of the following organisations, which contributed $10,000 or more to our research in 2019

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VICTORIA State Government

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Helping Australians in need since 1912

aifa allergy and immunology foundation of australasia

Australian Cancer Research Foundation

Australian Government | Australia-China Council

Australian Communities Foundation

Rotary Districts of Australia

Bb Bellberry Limited supporting research and ethics

Besen Family Foundation

Bill & Melinda Gates foundation

BCRF Breast Cancer Research Foundation

Cancer Council Victoria

CASS The CASS Foundation

Cerebral Palsy Alliance

Coeliac Australia

Colonial Foundation

CSL

Cure Brain Cancer Foundation

Cure Cancer Australia Foundation

Donald Cant Watts Corke

Fulton Bequest 1904

The Financial Markets Foundation for Children

FSHD Global Research Foundation Ltd

Geok Hua Wong CharitableTrust

HSANZ

The Hermon Slade Foundation

The Ian Potter Foundation

Isabella & Marcus foundation

The Jack Brockhoff Foundation

JDRF Improving lives. Curing Type 1 Diabetes.

JTR John T Reid Charitable Trusts

The Kids' Cancer Project Science. Solutions. Survival.

L.E.W. Carty Charitable Fund

Leukemia & Lymphoma Society fighting blood cancers

Leukaemia Foundation Vision to cure. Mission to care.

The Michael J. Fox Foundation for Parkinson's Research

mnd Australia

National Breast Cancer Foundation

NIH National Institutes of Health

National Psoriasis Foundation

pancare Foundation taking up the challenge

The Portland House Foundation

Prader-Willi Research Foundation Australia

Quintessential Equity

RCD

The Royal Melbourne Hospital Foundation

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The Sylvia & Charles Viertel Charitable Foundation

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the upstream foundation

veski

Victorian Cancer Agency | Victoria State Government

wellcome trust

worldwide cancer research

Yulgilbar The Yulgilbar Foundation

The Walter and Eliza Hall Institute is associated with the following organisations

THE UNIVERSITY OF MELBOURNE

MELBOURNE HEALTH

agrf

Anaxis Pharma

Athena SWAN Member

AURORA EDUCATION FOUNDATION

AURORA

aamri
Association of Australian Medical Research Institutes

Australian Genomics Health Alliance

BIOMEDICAL RESEARCH VICTORIA
INNOVATING FOR HEALTH

BIOGRID AUSTRALIA
Health through information

Cancer Therapeutics CRC

Cancer Trials Australia

CareerTrackers Indigenous Internship Program

CART-WHEEL
Center for Analysis of Rare Tumors

CATALYST therapeutics

transbcr
CENTRE FOR TRANSLATIONAL BREAST CANCER RESEARCH

GTAC
GENE TECHNOLOGY ACCESS CENTRE

ionopticks
discover more

MALE CHAMPIONS OF CHANGE

MRCF

Melbourne Academic Centre for Health

Melbourne Biomedical Precinct.

Melbourne Genomics Health Alliance

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Type 1 Diabetes TrialNet

Victorian Cancer Biobank

VICTORIAN COMPREHENSIVE CANCER CENTRE

In-kind support was received from:

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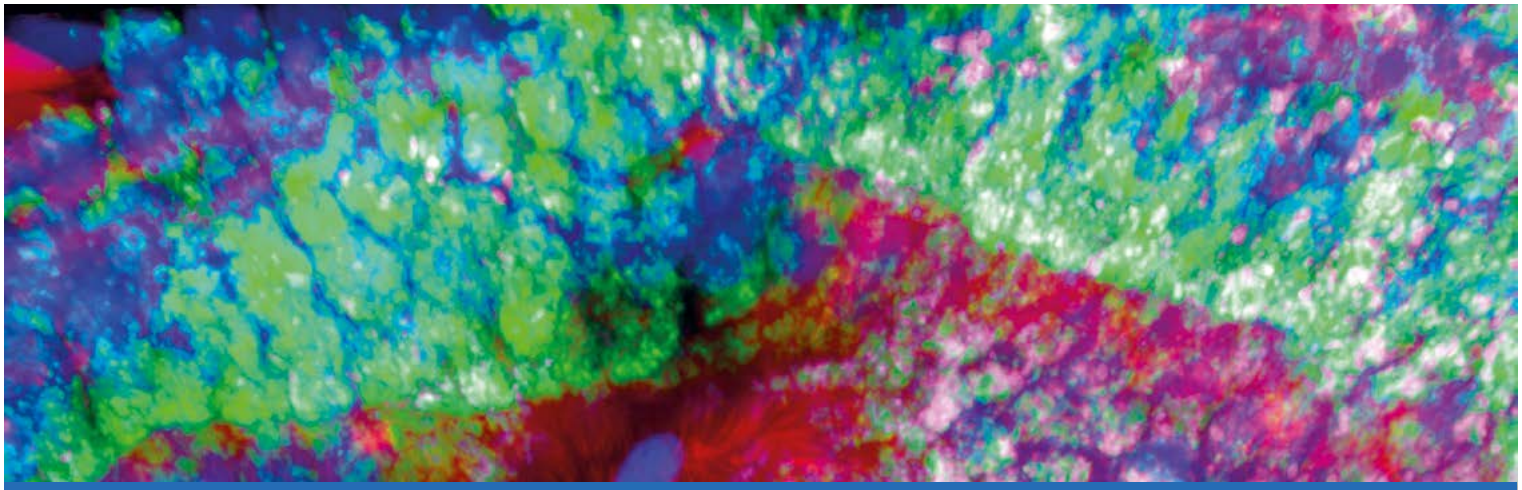
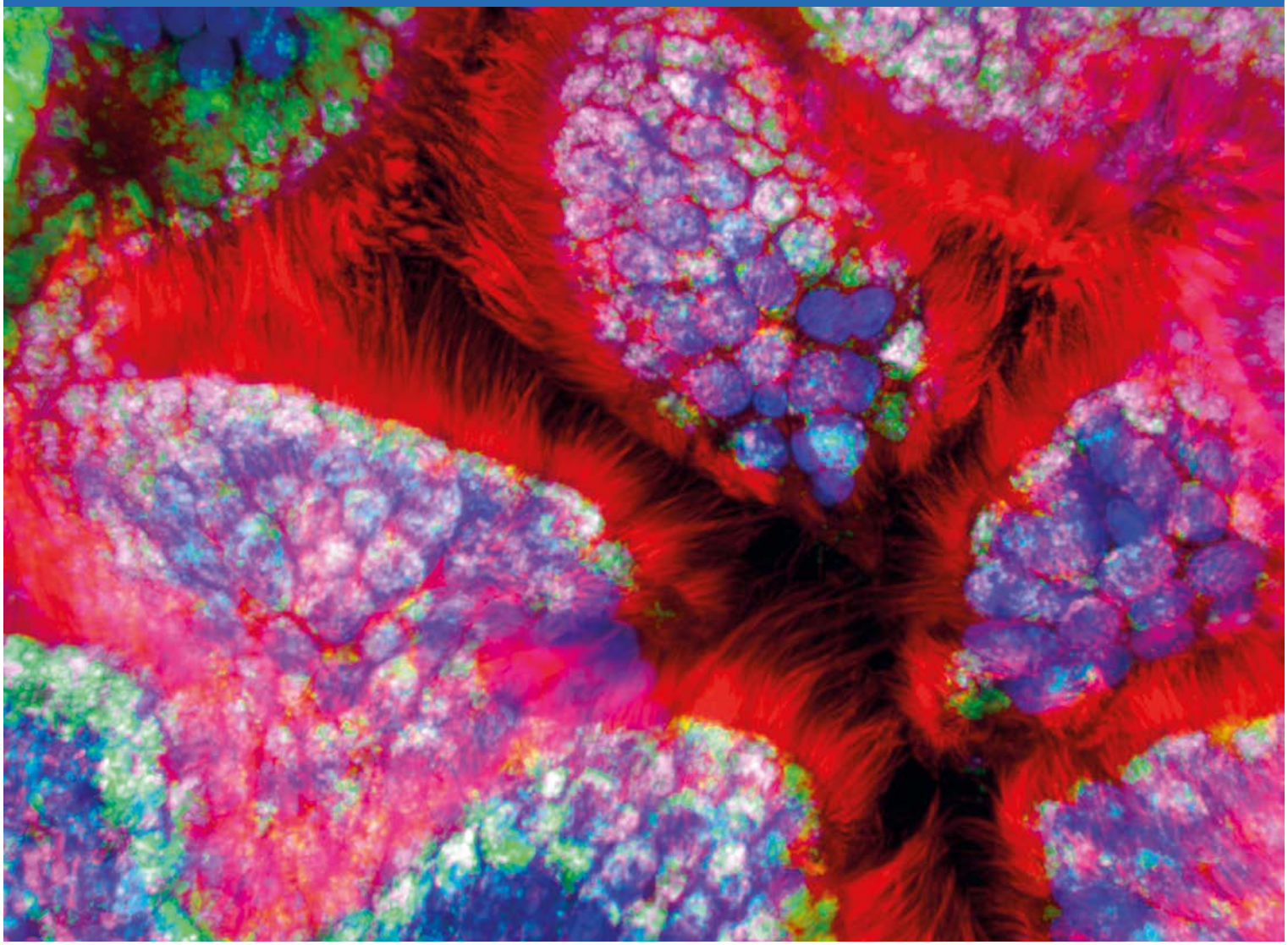


Walter+Eliza Hall
Institute of Medical Research

DISCOVERIES FOR HUMANITY

ANNUAL REPORT
2019 FINANCIAL STATEMENTS



Financial statements contents

Statement of profit or loss and other comprehensive income for the year ended 31 December 2019

Operating revenue	Note	2019 $'000	2018 $'000
Government revenue			
National Health and Medical Research Council		39,708	41,407
Cooperative Research Centres		2,451	2,333
Other Australian Government grants		4,139	1,161
Other Australian Government fellowships		-	156
Victorian Government grants		10,513	10,909
Foreign Government grants and fellowships		70	22
		56,881	**55,988**
Other grant revenue			
Industrial grants and contracts		8,689	7,182
Philanthropic grants and fellowships – Australia		13,399	15,759
Philanthropic grants and fellowships – International		3,343	6,824
		25,431	**29,765**
Other revenue			
Investment income	2	24,156	30,063
Royalty income		7,483	4,027
General income		8,916	8,260
Donations and bequests		10,373	13,568
		50,928	**55,918**
Total operating revenue before monetisation		**133,240**	**141,671**
Royalty monetisation income (venetoclax)	5	35,633	-
Total operating revenue		**168,873**	**141,671**

The financial statements are to be read in conjunction with the notes to, and forming part of the financial statements.

Operating expenditure	Note	2019 $'000	2018 $'000
Scientific laboratories			
Staff costs		61,389	62,057
Apparatus and equipment		2,576	2,409
Consumable supplies		11,065	12,393
Other expenses		5,881	4,505
		80,911	**81,364**
Support laboratories			
Staff costs		13,355	14,397
Apparatus and equipment		989	943
Consumable supplies		1,287	1,528
Other expenses		1,637	1,612
		17,268	**18,480**
Professional services			
Staff costs		11,432	10,549
Furniture & equipment		97	287
Building operating costs and maintenance		5,908	5,801
Other expenses		6,308	6,361
		23,745	**22,998**
Strategic initiatives			
Staff costs		12,165	3,490
Furniture & equipment		105	155
Other expenses		3,976	1,648
		16,246	**5,293**
Allowance for credit loss increase / (decrease)	8(b)	62	188
Unrealised foreign exchange loss / (gain)		477	(4,998)
Total operating expenditure before monetisation		**138,709**	**123,325**
Royalty monetisation (venetoclax)			
Provision for net commercial income distribution and associated payments	5	10,104	4,755
Total operating expenditure		**148,813**	**128,080**
Surplus / (deficit) from operations		**20,060**	**13,591**
Other income	3	297	2
Depreciation and amortisation - property, plant and equipment	11	(10,886)	(9,368)
Depreciation and amortisation - right of use assets	18	(55)	-
Gain/(loss) on financial assets taken to profit or loss (FVTPL Instruments)		5,261	(589)
Bequests and grants for capital works		6,435	7,708
Net surplus / (deficit) from operations	16(a)	**21,112**	**11,344**
Other comprehensive income			
Items that will not be reclassified subsequently to profit or loss			
Gain / (loss) on financial assets taken to equity (FVTOCI equity Instruments)	16(g)	59,682	(28,996)
Transfer derecognition of Land Lease (PPE) on initial adoption of AASB 16	16(c)	(16,182)	-
Items that may be reclassified subsequently to profit or loss			
Gain / (loss) on financial assets taken to equity (FVTOCI debt Instruments)	16(g)	1,508	(858)
Cumulative gain reclassified to profit or loss on sale of financial assets (FVTOCI Debt Instruments)	16(g)	(293)	-
Total comprehensive income / (loss) for the year		**65,827**	**(18,510)**

The financial statements are to be read in conjunction with the notes to, and forming part of the financial statements.

Statement of financial position as at 31 December 2019

Assets	Note	2019 $'000	2018 $'000
Current assets			
Cash and cash equivalents	17(a)	69,982	67,743
Current tax assets	8(a)	1,240	5,278
Trade and other receivables	8(b)	51,311	13,036
Prepayments		1,670	1,042
Prepaid operating lease	9	-	32
Total current assets		**124,203**	**87,131**
Non-current assets			
Other financial assets	10	547,641	465,513
Property, plant and equipment	11	183,919	199,157
Prepaid operating lease	9	-	2,544
Right of use assets	18	2,736	-
Total non-current assets		**734,296**	**667,214**
Total assets		**858,499**	**754,345**
Liabilities			
Current liabilities			
Trade and other payables	12	10,087	14,739
Provisions	13	37,852	28,678
Unearned grants and fellowships	14	49,931	15,221
Other liabilities	15	264	270
Total current liabilities		**98,134**	**58,908**
Non-current liabilities			
Provisions	13	34,864	35,763
Total non-current liabilities		**34,864**	**35,763**
Total liabilities		**132,998**	**94,671**
Net assets		**725,501**	**659,674**
Funds			
Permanent invested funds	16(b)	198,833	194,181
General funds	16(c)	371,193	377,710
Royalty fund	16(d)	55,039	48,054
Leadership fund	16(e)	27,965	26,557
Discovery fund	16(f)	5,271	4,961
Investment revaluation reserve	16(g)	67,200	8,211
Total funds		**725,501**	**659,674**

The financial statements are to be read in conjunction with the notes to, and forming part of the financial statements.

Statement of cash flows for the year ended 31 December 2019

	Note	2019	2018
Cash flows from operating activities		**$'000**	**$'000**
Donations and bequests		10,311	13,377
General income		10,071	9,490
Receipts from granting bodies		124,754	72,944
GST paid to ATO		(3,232)	(3,398)
Payments to suppliers and employees		(150,797)	(133,343)
Royalty receipts		1,673	4,027
Dividends received		23,172	19,038
Interest and bill discounts received		7,514	11,902
Net cash (used in) / provided by operating activities	17(b)	**23,466**	**(5,963)**
Cash flows from investing activities			
Payment for other financial assets		(73,538)	(281,777)
Proceeds on sale of other financial assets		58,139	20,099
Grants and donations for property, plant and equipment		5,076	1,198
Payment for property, plant and equipment		(12,335)	(22,028)
Net cash (used in) / provided by investing activities		**(22,658)**	**(282,508)**
Cash flows from financing activities			
Donations and bequests to permanent invested funds		1,359	6,510
Net cash used in financing activities		**1,359**	**6,510**
Net increase / (decrease) in cash held		**2,167**	**(281,961)**
Cash and cash equivalents at the beginning of the year		**67,473**	**344,436**
Effects of exchange rate changes on the balance of cash held in foreign currencies		(477)	4,998
Cash and cash equivalents at the end of the year	17(a)	**69,163**	**67,473**

The financial statements are to be read in conjunction with the notes to, and forming part of the financial statements.

Statement of changes in equity

	Permanent fund	General fund	Royalty fund	Leadership fund	Discovery fund	Investment revaluation reserve	Total
Balance at 1 January 2018	**185,610**	**378,204**	**44,410**	**24,562**	**4,545**	**40,853**	**678,184**
Equity transfer on initial adoption of AASB 9	-	7,969	-	-	-	(7,969)	-
Transfers not reflected in current year surplus	-	(5,181)	-	-	-	5,181	-
Surplus / (deficit) for the year	8,571	(3,282)	3,644	1,995	416	-	**11,344**
Other comprehensive income for the year							
Gain / (loss) on investments	-	-	-	-	-	(29,854)	**(29,854)**
Total comprehensive income / (loss) for the year	**8,571**	**(494)**	**3,644**	**1,995**	**416**	**(32,642)**	**(18,510)**
Balance at 31 December 2018	**194,181**	**377,710**	**48,054**	**26,557**	**4,961**	**8,211**	**659,674**
Transfer derecognition of Land Lease (PPE) on initial adoption of AASB 16	-	(16,182)	-	-	-	-	**(16,182)**
Transfers not reflected in current year surplus	-	1,908	-	-	-	(1,908)	-
Surplus / (deficit) for the year	4,652	7,757	6,985	1,408	310	-	**21,112**
Other comprehensive income for the year							-
Gain / (loss) on investments	-	-	-	-	-	60,897	**60,897**
Total comprehensive income / (loss) for the year	**4,652**	**(6,517)**	**6,985**	**1,408**	**310**	**58,989**	**65,827**
Balance at 31 December 2019	**198,833**	**371,193**	**55,039**	**27,965**	**5,271**	**67,200**	**725,501**

The financial statements are to be read in conjunction with the notes to, and forming part of the financial statements.

Notes to the annual accounts for the year ended 31 December 2019

1. Statement of significant accounting policies

The Walter and Eliza Hall Institute of Medical Research ('the Institute') is incorporated in Victoria as a company limited by guarantee. The Institute has 224 members and the guarantee is limited to two dollars per member.

The financial report is a general purpose financial report in accordance with the Australian Charities and Not-for-profits Commission Act 2012, Australian Accounting Standards (AASs) and complies with other requirements of the law. Accounting Standards include Australian equivalents to International Financial Reporting Standards (A-IFRS). The Institute is exempt from taxation. The Institute is a not-for-profit entity.

The financial statements were authorised for issue by the directors on 26 March 2020.

The financial report has been prepared on the basis of historical cost except for the revaluation of certain non-current assets and financial instruments. Cost is based on the fair values of consideration given in exchange for assets.

The Institute is a company of the kind referred to in ASIC Corporations (Rounding in Financial/Directors' Reports) Instrument 2016/191 dated 24 March 2016, and in accordance with that Class Order amounts in the financial report are rounded to the nearest thousand dollars, unless otherwise indicated.

Accounting policies are selected and applied in a manner which ensures that the resulting financial information satisfies the concepts of relevance and reliability, thereby ensuring that the substance of the underlying transactions or other events is reported.

The following significant accounting policies have been adopted in the preparation and presentation of the financial report:

(a) Reporting Entity

The financial statements include all the activities of The Walter and Eliza Hall Institute of Medical Research.

Principal address of the Institute is:

1G Royal Parade

Parkville, Victoria, 3052

(b) Property, plant and equipment

Property, plant and equipment held for use in research, or for administrative purposes, are stated in the statement of financial position at cost, less any subsequent accumulated depreciation.

Depreciation is provided on property, plant and equipment. Depreciation is calculated on a straight-line basis so as to write off the net cost of each asset over its expected useful life.

A regular review of useful lives, depreciation rates and residual values is conducted at each year end, with the effect of any changes in estimate accounted for on a prospective basis.

The following table indicates the expected useful lives of non current assets on which the depreciation charges are based.

	31 December 2019	31 December 2018
Buildings	20 - 40 years	20 - 40 years
Plant and equipment	3 - 20 years	3 - 20 years
Furniture and fittings	5 - 20 years	5 - 20 years

(c) Acquisition of assets

Assets acquired are recorded at the cost of acquisition, being the purchase consideration determined as at the date of acquisition plus costs incidental to the acquisition. Items of property, plant and equipment are recorded at cost less accumulated depreciation.

(d) Source of capital funds

The Institute is a company limited by guarantee and as such has no issued capital.

(i) Permanent Invested Funds originate from gifts and bequests, the income from which is applied as stipulated by the donor, or to general research where there is no specific stipulation. These gifts and bequests are appropriated to Capital Funds.

(ii) General Funds consist of the net accumulation of surpluses and deficits of prior years.

(iii) The Royalty Fund consists of the balance of royalties received in respect of patented inventions and not expended.

(iv) The Leadership Fund consists of donations and income earned thereon. The Leadership Fund was established in honour of Professors Gustav Nossal, Donald Metcalf, Jacques Miller and Suzanne Cory to provide named fellowships to nurture the development of outstanding young scientists with the potential to be future leaders of biomedical research.

(v) The Discovery Fund consists of donations and income earned thereon, less funds spent on research to date. The Fund was established by the Institute to support specialist research and will be applied based on the merits of submissions to the Institute Director. There are three areas of focus; early drug discovery, blue sky basic biological research and technical innovation.

(vi) The Investment Revaluation Reserve consists of gains and losses recognised through movement in the fair value of investments and other financial assets.

(e) Revenue recognition

The Institute recognises income from its main revenue/income streams, as listed below:

- Research grants
- Infrastructure grants
- Donations and bequests
- Capital grants - buildings and equipment
- Royalty Income
- Sales of goods/services

Research grants

Government and other grant funds received for research purposes generally have conditions attached for specific services to be performed. These agreements are considered reciprocal under AASB 1004 'Contributions' and as such, revenue is only recognised once the services have been performed, typically being the expenditure incurred in relation to the specific grant. Until such point, revenue is recorded as deferred income. For non-reciprocal grants, revenue is recognised upfront and not deferred.

Infrastructure grants, donations and bequests

When the Institute receives government grants (excluding research grants), donations and bequests that are within the scope of AASB 1058 (being a transaction where the consideration paid to acquire an asset is significantly less than fair value principally to enable the Institute to further its objectives), it performs an assessment to determine if the contract is 'enforceable' and contains 'sufficiently specific' performance obligations.

In cases where there is an 'enforceable' contract with a customer with 'sufficiently specific' performance obligations, the transaction is accounted for under AASB 15 where income is recognised when (or as) the performance obligations are satisfied.

In all other cases (where the contract is not 'enforceable' or the performance obligations are not 'sufficiently specific'), the transaction is accounted for under AASB 1058 where the Institute:

- Recognises the asset in accordance with the requirements of other relevant applicable Australian Accounting Standards (e.g. AASB 9, AASB 16, AASB 116 and AASB 138)
- Considers whether any other financial statement elements should be recognised ('related amounts') in accordance with the relevant applicable Australian Accounting Standard including:
  - contributions by owners (AASB 1004)
  - a lease liability (AASB 16)
  - a financial instrument (AASB 9)
  - a provision (AASB 137)
- Recognises income immediately in profit or loss for the excess of the initial carrying amount of the asset over any related amounts recognised.

Capital grants – Buildings and Equipment

For capital grants received under an enforceable agreement where it includes a transfer to enable the Institute to acquire or construct a recognisable non-financial asset to identified specifications which will be controlled by the Institute when completed, the Institute recognises a liability for the excess of the fair value of the transfer over any related amounts recognised and recognises income as it satisfies its obligations under the transfer. As the capital grants received by the Institute are primarily for buildings works and scientific equipment, the Institute recognises income as the building works are completed and as equipment is purchased/constructed (when it satisfies its obligations).

Royalty Income

Royalty income is accounted for under AASB 15 and is recognised when there is an enforceable right to receive income.

Sales of goods/services

Revenue is recognised when control of the goods has been transferred to the customer or the service/performance obligation has been provided.

(f) Investments and other financial assets

(i) Initial measurement and derecognition

Financial assets and financial liabilities are initially measured at fair value. Transaction costs that are directly attributable to the acquisition or issue of financial assets and financial liabilities (other than financial assets and financial liabilities at fair value through profit or loss) are added to or deducted from the fair value of the financial assets or financial liabilities, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at fair value through profit or loss are recognised immediately in profit or loss.

All regular way purchases or sales of financial assets are recognised and derecognised on a trade date basis. Regular way purchases or sales are purchases or sales of financial assets that require delivery of assets within the time frame established by regulation or convention in the marketplace. All recognised financial assets are measured subsequently in their entirety at either amortised cost or fair value, depending on the classification of the financial assets.

(ii) Classification of financial assets

Debt instruments that meet the following conditions are measured subsequently at amortised cost:

- the financial asset is held within a business model whose objective is to hold financial assets in order to collect contractual cash flows; and
- the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

Debt instruments that meet the following conditions are measured subsequently at fair value through other comprehensive income (FVTOCI):

- the financial asset is held within a business model whose objective is achieved by both collecting contractual cash flows and selling the financial assets; and
- the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

By default, all other financial assets are measured subsequently at fair value through profit or loss (FVTPL). Despite the foregoing, the Institute may make the following irrevocable election/designation at initial recognition of a financial asset:

- the Institute may irrevocably elect to present subsequent changes in fair value of an equity investment in other comprehensive income if certain criteria are met; and
- the Institute may irrevocably designate a debt investment that meets the amortised cost or FVTOCI criteria as measured at FVTPL if doing so eliminates or significantly reduces an accounting mismatch.

Financial assets at amortised cost using the effective interest method

The amortised cost of a financial asset is the amount at which the financial asset is measured at initial recognition minus the principal repayments, plus the cumulative amortisation using the effective interest method of any difference between that initial amount and the maturity amount, adjusted for any loss allowance. The gross carrying amount of a financial asset is the amortised cost of a financial asset before adjusting for any loss allowance. The Institute's cash and cash equivalents and trade receivables fall within this category.

Interest income is recognised in profit or loss and is included in the "investment income" line item (note 2).

Debt Instruments at fair value through other comprehensive income (FVTOCI)

The corporate bonds held by the Institute are classified as FVTOCI. Subsequently, changes to the carrying value due to foreign exchange, impairment and interest income are recognised in the profit and loss. All other changes in the carrying value will be recognised in other comprehensive income. Upon derecognition, the cumulative gains or losses previously recognised in other comprehensive income are reclassified to profit or loss. Corporate bonds were previously classified as 'available for sale' under AASB 139.

Equity instruments at fair value through other comprehensive income (Equity FVTOCI)

On initial recognition, the Institute may make an irrevocable election (on an instrument-by-instrument basis) to designate investments in equity instruments as at FVTOCI. Designation at FVTOCI is not permitted if the equity investment is held for trading. Investments in equity instruments at FVTOCI are initially measured at fair value plus transaction costs. Subsequently, they are measured at fair value with gains and losses arising from changes in fair value recognised in other comprehensive income and accumulated in the investments revaluation reserve. The cumulative gain or loss is not reclassified to profit or loss on disposal of equity investments, instead, it is transferred to retained earnings.

Dividends on these investments in equity instruments are recognised in profit and loss in accordance with AASB 9. This is included in the "investment income" line item (note 2).

This category includes equity investments which were previously classified as 'available-for-sale' under AASB 139.

Financial assets at fair value through profit or loss (FVTPL)

Financial assets that are held within a different business model other than 'hold to collect' or 'hold to collect and sell' are categorised at fair value through profit and loss. Further, irrespective of business model financial assets whose contractual cash flows are not solely payments of principal and interest are accounted for at FVTPL. The Institute's investment in hybrid instruments and managed international share fund fall within this category. These were previously classified as 'available-for-sale' under AASB 139.

(iii) Foreign exchange gains and losses

The carrying amount of financial assets that are denominated in a foreign currency is determined in that foreign currency and translated at the spot rate at the end of each reporting period.

(iv) Impairment of financial assets

The Institute recognises a loss allowance for expected credit losses (ECL) on investments in debt instruments that are measured at amortised cost or at FVTOCI, lease receivables, trade receivables and contract assets, as well as on financial guarantee contracts. The amount of expected credit losses is updated at each reporting date to reflect changes in credit risk since initial recognition of the respective financial instrument.

The Institute recognises lifetime ECL when there has been a significant increase in credit risk since initial recognition. However, if the credit risk on the financial instrument has not increased significantly since initial recognition, the Institute measures the loss allowance for that financial instrument at an amount equal to 12-month ECL.

Lifetime ECL represents the expected credit losses that will result from all possible default events over the expected life of a financial instrument. In contrast, 12-month ECL represents the portion of lifetime ECL that is expected to result from default events on a financial instrument that are possible within 12 months after the reporting date.

(v) Term Deposits are recorded at amortised cost, with revenue recognised on an accruals basis.

(vi) Dividend revenue is recognised when the dividend is received. Interest revenue is recognised and accrued on a time proportionate basis that takes into account the effective yield on the financial asset.

(vii) Interests in jointly controlled assets or operations

In respect of any interest in jointly controlled assets, the Institute does not consolidate but recognises in the financial statements:

- its share of jointly controlled assets;
- any liabilities that it had incurred;
- its share of liabilities incurred jointly by the joint venture;
- any income earned from the selling or using of its share of the output from the joint venture; and
- any expenses incurred in relation to being an investor in the joint venture.

For jointly controlled operations, the Institute recognises: the assets that it controls and the liabilities that it incurs; expenses that it incurs; and its share of income that it earns from selling outputs of the joint venture.

(g) Cash and cash equivalents

Cash comprises cash on hand and on-demand deposits. Cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash, which are subject to an insignificant risk of changes in value and have a maturity of three months or less at the date of acquisition.

(h) Trade and Other Receivables

Trade and other receivables are recognised initially at fair value and subsequently measured at amortised cost using the simplified approach to record the loss allowance at the amount equal to the expected lifetime credit losses. The Institute uses historical experience and forward looking information to calculate expected credit losses.

(i) Trade and Other Payables

Trade payables and other accounts payables are initially measured at fair value and then subsequently carried at amortised cost. They are recognised when the Institute becomes obliged to make future payments resulting from the purchase of goods and services.

(j) Research costs

Research costs are recognised as an expense when incurred and reported in the financial year in which they relate.

(k) Goods and Services Tax (GST)

Revenues, expenses and assets are recognised net of the amount of GST except:

(i) where the amount of GST incurred is not recoverable from the taxation authority, it is recognised as part of the cost of acquisition of an asset or as part of an item of expense; or

(ii) for receivables and payables which are recognised inclusive of GST.

The net amount of GST recoverable from, or payable to, the taxation authority is included as part of receivables or payables. Cash flows are included in the statement of cash flows on a gross basis. The GST component of cash flows arising from investing and financing activities which is recoverable from, or payable to, the taxation authority is classified within operating cash flows.

(l) Provisions

Provisions are recognised when there is a present obligation (legal or constructive) as a result of a past event, it is probable that the organisation is required to settle the obligation, and a reliable estimate can be made of the amount of the obligation. The amount recognised as a provision is the best estimate of the consideration required to settle the present obligation at the end of the reporting period, taking into account the risks and uncertainties surrounding the obligation. When a provision is measured using the cash flows estimated to settle the present obligation, its carrying amount is the present value of those cash flows (where the effect of the time value of money is material).

(m) Employee benefits

Provision is made for benefits accruing to employees in respect of annual leave and long service leave, when it is probable that settlement will be required and they are capable of being measured reliably.

Provisions made in respect to annual leave and long service leave expected to be settled within 12 months, are measured at their nominal values, using the remuneration rate expected to apply at the time of settlement.

Provisions made in respect to long service leave which are not expected to be settled within 12 months are measured at the present value of the estimated future cash outflows to be made by the Institute in respect of services provided by employees up to the reporting date.

(n) Foreign currency

All foreign currency transactions during the financial year are brought to account using the exchange rate in effect at the date of the transaction. Foreign currency monetary items at reporting date are translated at the exchange rate existing at that date and exchange differences are recognised in the net surplus or deficit in the period in which they arise.

(o) Leased assets

The Institute as lessee

The Institute assesses whether a contract is or contains a lease, at inception of the contract. The Institute recognises a right-of-use asset and a corresponding lease liability with respect to all lease arrangements in which it is the lessee, except for short-term leases (defined as leases with a lease term of 12 months or less) and leases of low value assets (such as tablets and personal computers, small items of office furniture and telephones). For these leases, the Institute recognises the lease payments as an operating expense on a straight-line basis over the term of the lease unless another systematic basis is more representative of the time pattern in which economic benefits from the leased assets are consumed.

Lease Liability

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted by using the rate implicit in the lease. If this rate cannot be readily determined, the Institute uses an indicative borrowing rate.

Lease payments included in the measurement of the lease liability comprise:

- Fixed lease payments (including in-substance fixed payments), less any lease incentives receivable;
- Variable lease payments that depend on an index or rate, initially measured using the index or rate at the commencement date;
- The amount expected to be payable by the lessee under residual value guarantees;
- The exercise price of purchase options, if the lessee is reasonably certain to exercise the options; and
- Payments of penalties for terminating the lease, if the lease term reflects the exercise of an option to terminate the lease.

The lease liability is included within 'Trade and other payables' in the statement of financial position. The lease liability is subsequently measured by increasing the carrying amount to reflect interest on the lease liability (using the effective interest method) and by reducing the carrying amount to reflect the lease payments made.

The Institute reviews and remeasures the lease liability (and makes a corresponding adjustment to the related right-of-use asset) where required.

Right-of-use-asset

Right-of-use assets comprise the initial measurement of the corresponding lease liability, lease payments made at or before the commencement date, less any lease incentives received and any initial direct costs. They are subsequently measured at cost less accumulated depreciation and impairment losses.

If the Institute incurs an obligation for costs to dismantle and remove a leased asset, restore the site on which it is located or restore the underlying asset to the condition required by the terms and conditions of the lease, a provision is recognised and measured. To the extent that the costs relate to a right-of-use asset, the costs are included in the related right-of-use asset.

Right-of-use assets are depreciated over the shorter period of the lease term and useful life of the underlying asset. If a lease transfers ownership of the underlying asset or the cost of the right-of-use asset reflects that the Institute expects to exercise a purchase option, the related right-of-use asset is depreciated over the useful life of the underlying asset. The depreciation starts at the commencement date of the lease.

The Right-of-use assets are presented as a separate line in the statement of financial position. The Institute reviews right-of-use assets for impairment annually.

Variable rents that do not depend on an index or rate are not included in the measurement of the lease liability and the right-of-use asset. The related payments are recognised as an expense in the period in which the event or condition that triggers those payments occurs and are included in "Other expenses" in profit or loss.

Concessionary leases

The Institute has several leases for premises which are provided at significantly below-market terms and conditions, principally to enable the Institute to further its medical research objectives.

The Institute is dependent on these leases as the premises are used to run its operations to deliver medical research outcomes. The Institute is restricted on the use of these premises by the lease providers and may not utilise the premises for other purposes. The Institute measures concessionary leases at cost.

A summary of concessionary leases held by the Institute is located in note 26.

The Institute as lessor

The Institute enters into sub-lease agreements as a lessor with respect to the Parkville and Bundoora premises.

Leases for which the Institute is a lessor are classified as finance or operating leases. Whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee, the contract is classified as a finance lease. All other leases are classified as operating leases. The Institute is currently not the lessor for any finance leases.

Rental income from operating leases is recognised on a straight-line basis over the term of the relevant lease. Initial direct costs incurred in negotiating and arranging an operating lease are added to the carrying amount of the leased asset and recognised on a straight-line basis over the lease term.

When a contract includes both lease and non-lease components, the Institute applies AASB 15 to allocate the consideration under the contract to each component.

(p) Impairment of non-financial assets

All assets are assessed annually for indications of impairment. If there is an indication of impairment, the assets concerned are tested as to whether their carrying value exceeds their possible recoverable amount. Where an asset's carrying value exceeds its recoverable amount, the difference is written-off as an expense. The recoverable amount for most assets is measured at the higher of value in use and fair value less costs to sell. Depreciated replacement cost is used to determine value in use. Depreciated replacement cost is the current replacement cost of an item of plant and equipment less, where applicable, accumulated depreciation to date, calculated on the basis of such cost.

(q) Properties held for sale

Properties are classified as held for sale when they are immediately available for sale in their present condition and their sale is highly probable and expected to be completed within 12 months of the Institute's reporting date.

The properties are valued at fair value less costs to sell.

(r) Critical accounting judgements and key sources of estimation uncertainty

In the application of the Institute's accounting policies, which are described above, management may from time to time make judgements, estimates and assumptions about the carrying values of assets and liabilities that may not be readily apparent from other sources. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances, the result of which form the basis of making the judgement. Key areas in which management has exercised judgement include the calculation of the fair value of financial assets, the carrying value of employee benefits, the carrying value of provisions for royalties and revenue recognition assessment.

(s) Impact of new and revised Accounting Standards

In the current period, the Institute has adopted all of the new and revised standards and interpretations issued by the Australian Accounting Standards Board (the AASB) that are relevant to its operations and effective for the current reporting period.

New and revised Standards that have impacted the Institute

AASB 16 'Leases'

In the current year, the Institute has applied AASB 16 that is effective for annual periods that begin on or after 1 January 2019. AASB 16 introduces new or amended requirements with respect to lease accounting. It introduces significant changes to lessee accounting by removing the distinction between operating and finance leases and requiring the recognition of a right-of-use asset and a lease liability at commencement of all leases, except for short-term leases and leases of low value assets. In contrast to lessee accounting, the requirements for lessor accounting have remained largely unchanged.

The date of initial application of AASB 16 for the Institute is 1 January 2019. The Institute has applied AASB 16 using the modified retrospective approach. Prior year comparisons are not restated.

Impact of the new definition of a lease

The Institute has made use of the practical expedient available on transition to AASB 16 and opted not to reassess whether a contract is or contains a lease. Accordingly, the definition of a lease in accordance AASB 117 Leases and Interpretation 4 'Determining whether an Arrangement contains a Lease' will continue to be applied to those contracts entered or modified before 1 January 2019.

The change in definition of a lease mainly relates to the concept of control. AASB 16 determines whether a contract contains a lease on the basis of whether the customer has the right to control the use of an identified asset for a period of time in exchange for consideration. This is in contrast to the focus on 'risks and rewards' in AASB 117.

Impact on Lessee Accounting

Former operating leases

AASB 16 changes how the Institute accounts for leases previously classified as operating leases under AASB 117, which were off balance sheet.

Applying AASB 16, for all leases (except concessionary leases as noted below), the Institute:

(a) Recognises right-of-use assets and lease liabilities in the statement of financial position, initially measured at the present value of the future lease payments;
(b) Recognises depreciation of right-of-use assets and interest on lease liabilities in profit or loss;
(c) Separates the total amount of cash paid into a principal portion (presented within financing activities) and interest (presented within financing activities) in the statement of cash flows.

Lease incentives (e.g. rent-free period) are recognised as part of the measurement of the right-of-use assets and lease liabilities whereas under AASB 117 they resulted in the recognition of a lease incentive, amortised as a reduction of rental expenses generally on a straight-line basis.

Under AASB 16, right-of-use assets are tested for impairment in accordance with AASB 136 Impairment of Assets.

For short-term leases (lease term of 12 months or less) and leases of low-value assets (such as tablet and personal computers, small items of office furniture and telephones), the Institute has opted to recognise a lease expense on a straight-line basis as permitted by AASB 16. This expense is presented within 'Other expenses' in profit or loss.

Former finance leases

The main differences between AASB 16 and AASB 117 with respect to contracts formerly classified as finance leases is the measurement of the residual value guarantees provided by the lessee to the lessor. AASB 16 requires that the Institute recognises as part of its lease liability only the amount expected to be payable under a residual value guarantee, rather than the maximum amount guaranteed as required by AASB 117. This change did not have a material effect on the Institute's financial statements.

Impact on Lessor Accounting

AASB 16 does not change substantially how a lessor accounts for leases. Under AASB 16, a lessor continues to classify leases as either finance leases or operating leases and accounts for those two types of leases differently.

However, AASB 16 has changed and expanded the disclosures required, in particular with regard to how a lessor manages the risks arising from its residual interest in leased assets.

Under AASB 16, an intermediate lessor accounts for the head lease and the sub-lease as two separate contracts. The intermediate lessor is required to classify the sub-lease as a finance or operating lease by reference to the right-of-use asset arising from the head lease (and not by reference to the underlying asset as was the case under AASB 117).

AASB 2018-8 'Amendments to Australian Accounting Standards – Right-of-Use Assets of Not-for-Profit Entities'

In the current year, the Institute has applied AASB 2018-8 which is effective for an annual period that begins on or after 1 January 2019.

Leases at significantly below-market terms and conditions (concessionary leases)

For Not-for-Profit (NFP) entities with leases that have significantly below-market terms and conditions principally to enable the entity to further its objectives (commonly known as concessionary leases or peppercorn leases), AASB 1058 and AASB 16 requires NFP entities to measure right-of-use assets at initial recognition at fair value (based on AASB 13), the lease liability per AASB 16 and the difference to be accounted as income upfront.

AASB 2018-8 Amendments to Australian Accounting Standards – Right-of-Use Assets of Not-for-Profit Entities provides a temporary option for NFP lessees to elect to measure a class (or classes) of right-of-use assets arising under 'concessionary leases' at initial recognition, at either fair value or cost. If an entity chooses the cost option, additional disclosures are required for each material 'concessionary / peppercorn lease' on the nature and terms and the entity's dependence on such leases.

The Institute has conducted an analysis of the lease arrangements and notes that majority of its leases are at significantly below-market terms and conditions (concessionary leases). The Institute has made the necessary disclosures in note 26 for each of its concessionary leases. For the at-market leases, these will be accounted for under AASB 16 as above.

For the concessionary leases, the Institute has decided to make use of the temporary option under AASB 2018-8 to measure the right-of-use assets at cost on initial recognition. This resulted in a material impact to the Parkville Land Lease, previously disclosed at market value within property, plant and equipment. As a result of the temporary relief option, the Parkville Land Lease is now recognised at cost, resulting in a reduction to property, plant and equipment of $16,200,000 and a corresponding reduction to retained earnings as at 1 January 2019.

AASB 2019-8 Amendments to Australian Accounting Standards – Class of Right-of-Use Assets arising under Concessionary Leases

Amends AASB 16 Leases and AASB 1049 Whole of Government and General Government Sector Financial Reporting in respect of not-for-profit lessees' right-of-use assets arising under concessionary leases (i.e. leases that have significantly below-market terms and conditions to enable the entity to further its objectives), to:

- Specify right-of-use (ROU) assets arising under concessionary leases can be treated as a separate class of ROU assets to ROU assets arising under other leases for the purposes of AASB 16; and
- Extend the initial-measurement temporary relief to provide a temporary option for the Whole of Government and the General Government Sector not to measure ROU assets arising under concessionary leases at fair value in subsequent measurement.

Financial impact of the initial adoption of AASB 16

Impact on profit or loss	**31 Dec 2019**
Increase in depreciation of right of use asset	32,323
Decrease in other expenses	(32,000)
Decrease in surplus for the year	**323**

Reconciliation of adoption of AASB 16 at 1 January 2019

		Carrying amount	
	Closing balance as at 31 December 2018 (AASB 117)	**Re-measurement on adoption of AASB 16**	**Opening balance as at 1 January 2019 (AASB 16)**
	$'000	**$'000**	**$'000**
Assets			
Current assets			
Prepaid operating lease	32	(32)	-
Non current assets			
Property, plant and equipment	16,212	(16,212)	-
Prepaid operating lease	2,544	(2,544)	-
Right of use assets	-	2,792	2,792
Total assets	**18,788**	**(15,996)**	**2,792**
Current Liabilities			
Lease Liability	-	186	186

Reconciliation of equity for the impact of AASB 16 at 1 January 2019

Impacted area	**General funds**
Closing balance 31 December 2018	**377,710**
Derecognition of Parkville land lease - reclassify at cost (concessionary lease)	(16,200)
Decrease in depreciation on initial application to Bundoora building lease	18
Opening balance 1 January 2019 - AASB 16	**361,528**

AASB 2019-6 'Amendments to Australian Accounting Standards – Research Grants and Not-for-Profit Entities (AASB 15 & 1058)'

Research Grants

AASB 2019-6 permits an extended implementation period for the application of AASB 15 and AASB 1058 for research grants received, allowing application to reporting periods on or after 1 July 2019, instead of 1 January 2019. The extended implementation period applies to research grants only and not other revenue streams.

The Institute has elected to adopt AASB 2019-6 and will therefore defer implementation of AASB 15 & 1058 until the reporting period commencing 1 January 2020. Research grants will continue to be accounted for under AASB 1004 on a reciprocal/non-reciprocal basis.

AASB 15 'Revenue from Contracts with Customers' and AASB 1058 'Income of Not-for-Profit Entities'

AASB 1058 clarifies and simplifies the income recognition requirements that apply to not-for-profit (NFP) entities, in conjunction with AASB 15. The new income recognition requirements shift the focus from a reciprocal/non-reciprocal basis to a basis of assessment that considers the enforceability of a contract and the specificity of performance obligations. The core principle of the new income recognition requirements in AASB 1058 is that when a NFP entity enters into transactions where the consideration to acquire an asset is significantly less than the fair value of the asset principally to enable the entity to further its objectives, the excess of the asset recognised (at fair value) over any 'related amounts' is recognised as income immediately. An example of a 'related amount' is AASB 15 and in cases where there is an 'enforceable' contract with a customer with 'sufficiently specific' performance obligations, income is recognised when (or as) the performance obligations are satisfied under AASB 15, as opposed to any excess above the related amounts that would be immediate income recognition under AASB 1058. Under AASB 15, an entity recognises revenue when (or as) a performance obligation is satisfied, i.e. when 'control' of the goods or services underlying the particular performance obligation is transferred to the customer. AASB 15 introduces a 5-step approach to revenue recognition, which is more prescriptive than AASB 118.

General impact of application

The Institute has applied the new income requirements to its main revenue/income streams, as listed below:

- Infrastructure grants
- Donations and bequests
- Capital grants - buildings and equipment
- Royalty Income
- Sales of goods/services

Research grant income forms the largest income stream for the Institute and is excluded from the initial application as shown above in AASB 2019-6.

Infrastructure grants

The Institute has reviewed the ongoing government Infrastructure grants and determined there to be no impact as a result of the implementation of AASB 1058 as these agreements do not meet the 'sufficiently specific' criteria under AASB 15. Infrastructure income will continue to be recognised upfront in the year it is invoiced/received in line with AASB 1058.

Donations and bequests

The Institute has assessed that the adoption of the new income requirements do not have a significant impact on the amounts recognised in the financial statements as the majority of the donations and bequests do not meet the enforceability and the 'sufficiently specific' criteria under AASB 15 and would therefore be recognised as income once the Institute has controlled the relevant asset (assuming no other related amounts are applicable) under AASB 1058, which is in line with the previous income recognition under AASB 1004.

Capital grants – Buildings and Equipment

In cases where the transaction includes a transfer to enable an entity to acquire or construct a recognisable non-financial asset to be controlled by the entity, AASB 1058 requires the entity to recognise a liability for the excess of the fair value of the transfer over any related amounts recognised and recognises income as it satisfies its obligations under the transfer. Based on an analysis of the capital grant contracts, the Institute has concluded that the capital grants relate to recognisable non-financial assets (primarily for building works and equipment) and result in the reclassification of a liability of $261,708 in respect of the incomplete capital grants as at 1 January 2019. The Institute recognises income as it satisfies its obligations under the transfer (as the building works are constructed or equipment is acquired).

Royalty Income and sales of goods/services

The Institute has assessed that the adoption of AASB 15 does not have a significant impact on the amounts recognised. Revenue is recognised when control of the goods has been transferred the customer or the service/performance obligation has been provided. In the case of royalty income, the obligation has been provided once milestones or timeframes have been met.

Financial impact of the initial adoption of AASB 15 & AASB 1058

Reconciliation of adoption of AASB 15 & 1058 at 1 January 2019

Opening Balance impact	As presented under AASB 1004	AASB 1058/AASB 15 adjustments	As presented under AASB 15/AASB 1058
	$'000	$'000	$'000
Liabilities			
Unearned Grants and fellowships - Research Grants*	14,959	-	-
Unearned Grants and fellowships - Non Research Grants	262	(262)	-
Contract liabilities	-	262	262

* Research grants will continue to be recognised under AASB 1004 for 2019. Implementation of AASB 15 and AASB 1058 will be deferred to 1 January 2020 in line with AASB 2019-6.

Other new and revised Standards adopted

The Institute also adopted the following standards which had no material financial impact in the current period.

AASB 2017-1 'Amendments to Australian Accounting Standards – Transfers of Investment Property, Annual Improvements 2014-2016 Cycle and Other Amendments'

Amends the following standards:

- AASB 140 Investment Property – change in use.
- AASB 1 First-time Adoption of Australian Accounting Standards – deletion of exemptions for first-time adopters and addition of an exemption arising from Interpretation 22 Foreign Currency Transactions and Advance Consideration.
- AASB 128 Investments in Associates and Joint Ventures – measuring an associate or joint venture at fair value.

AASB 2017-6 Amendments to Australian Accounting Standards – Prepayment Features with Negative Compensation

The Institute has adopted the amendments to AASB 9 Financial Instruments for the first time in the current year. The amendments clarify that for the purpose of assessing whether a prepayment feature meets the 'solely payments of principal and interest' (SPPI) condition, the party exercising the option may pay or receive reasonable compensation for the prepayment irrespective of the reason for prepayment. In other words, financial assets with prepayment features with negative compensation do not automatically fail SPPI.

AASB 2017-7 Amendments to Australian Accounting Standards – Long-term Interests in Associates and Joint Ventures

The Institute has adopted the amendments to AASB 128 Investments in Associates and Joint Ventures for the first time in the current year. The amendment clarifies that AASB 9 Financial Instruments, including its impairment requirements, applies to other financial instruments in an associate or joint venture to which the equity method is not applied. These include long-term interests that, in substance, form part of the entity's net investment in an associate or joint venture. The Institute applies AASB 9 to such long-term interests before it applies AASB 128. In applying AASB 9, the Institute does not take account of any adjustments to the carrying amount of long-term interests required by AASB 128 (i.e., adjustments to the carrying amount of long-term interests arising from the allocation of losses of the investee or assessment of impairment in accordance with AASB 128).

AASB 2018-1 Amendments to Australian Accounting Standards – Annual Improvements

2015–2017 Cycle

The Institute has adopted the amendments included in AASB 2008-1 for the first time in the current year. The amendments to AASB 11 Joint Arrangements clarify that when a party that participates in, but does not have joint control of, a joint operation that is a business obtains joint control of such a joint operation, the Institute does not remeasure its previously held interest in the joint operation.

AASB 2018-2 Amendments to Australian Accounting Standards – Plan Amendment, Curtailment or Settlement

The Institute has adopted the amendments to AASB 119 Employee Benefits for the first time in the current year. The amendments clarify that the past service cost (or of the gain or loss on settlement) is calculated by measuring the defined benefit liability (asset) using updated assumptions and comparing benefits offered and plan assets before and after the plan amendment (or curtailment or settlement) but ignoring the effect of the asset ceiling (that may arise when the defined benefit plan is in a surplus position). AASB 119 is now clear that the change in the effect of the asset ceiling that may result from the plan amendment (or curtailment or settlement) is determined in a second step and is recognised in the normal manner in other comprehensive income.

AASB 2018-4 Amendments to Australian Accounting Standards – Australian Implementation Guidance for Not-for-Profit Public Sector Licensors

This Standard includes Australian Implementation Guidance and illustrative examples to AASB 15 Revenue from Contracts with Customers to provide:

- Guidance to distinguish a licence from a tax
- Clarification on the application of AASB 15 for revenue from 'non-intellectual property' licences (by extending the scope of AASB 15 to such licences)
- Practical recognition exemptions for short-term or low-value licences issued by not-for-profit public sector licensors.

AASB Interpretation 22 Foreign Currency Transactions and Advance Consideration

Clarifies how to determine the date of the transaction for the purpose of determining the exchange rate to use when recognising the receipt or payment of advance consideration in a foreign currency. The Interpretation requires an entity to determine the date of the transaction for the purpose of determining the exchange rate to use on initial recognition of the related asset, expense or income (or part of it) as the date on which the entity initially recognises the non-monetary asset or non-monetary liability arising from the payment or receive of advance consideration.

Standards and interpretations issued not yet effective

At the date of authorisation of the financial report, the standards and interpretations that are relevant to the Institute, listed below, were on issue but not yet effective.

The Institute is currently performing an assessment of the financial impacts and disclosures from the application of the new standards and their amendments on the financial reports.

Standard	Effective for annual reporting periods beginning on or after	Expected to be initially applied in the financial year ending
AASB 2019-6 Amendments to Australian Accounting Standards – Research Grants and Not-for-Profit Entities Amends AASB 15 Revenue from Contracts with Customers and AASB 1058 Income of Not-for-Profit Entities to - Permit not-for-profit entities to apply AASB 15 and AASB 1058 to research grants for annual reporting periods beginning on or after 1 July 2019 instead of 1 January 2019 (other income sources of not-for-profit entities remain within the scope of these standards from 1 January 2019) - Amend Examples 4A and 4B accompanying AASB 15 to clarify the analysis of how paragraph 35(a) (when a customer simultaneously receives and consumes the benefits of the entity's performance as the entity performs) applies in respect of research grants and research findings - Add a new example to illustrate a case with periodic performance obligations arising in respect of research activities. Note: Although this Amending Standard is effective from 1 January 2019, it has the effect of deferring the application of AASB 15 and AASB 1058 in respect of research grants to annual reporting periods beginning on or after 1 July 2019 as noted above. Accordingly, not-for-profit entities preparing full-year financial reports at December 2019 will not have to apply AASB 15 and AASB 1058 to research grants.	1 July 2019	31 December 2020

Standard	Effective for annual reporting periods beginning on or after	Expected to be initially applied in the financial year ending
AASB 15 'Revenue from Contracts with Customers' (Research Grant Revenue only) - AASB 2014-5 Amendments to Australian Accounting Standards arising from AASB 15 - AASB 2015-8 Amendments to Australian Accounting Standards – Effective date of AASB 15 - AASB 15 2016-3 Amendments to Australian Accounting Standards – Clarifications to AASB 15 AASB 15 replaces all existing revenue requirements in Australian Accounting standards and applies to all revenue arising from contracts with customers, unless the contracts are in scope of other standards, such as AASB 16. The core principle of AASB 15 is that an entity should recognise revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. AASB 15 introduces a 5-step approach to revenue recognition. AASB 15 uses the terms 'contract asset' and 'contract liability' to describe what might more commonly be known as 'accrued revenue' and 'deferred revenue', however the Standard does not prohibit an entity from using alternative descriptions in the statement of financial position. The Institute is currently in the process of implementing these changes to current policies and processes for research grant funding.	1 July 2019	31 December 2020
AASB 1058 'Income of Not-for-Profit Entities' (Research Grant Revenue only) - AASB 2016-7 Amendments to Australian Accounting Standards – Deferral of AASB 15 for Not-for-Profit Entities - AASB 2016-8 Amendments to Australian Accounting Standards – Australian Implementation Guidance for Not-for-Profit Entities AASB 1058 clarifies the income recognition requirements applying to not-for-profit entities in conjunction with AASB 15 Revenue from Contracts with Customers. The standard establishes principles applying to transactions where the consideration to acquire an asset is significantly less than fair value principally to enable a not-for-profit entity to further its objectives and the receipt of volunteer services. The standard also amends the application date of AASB 15 for not-for-profit entities to annual reporting periods beginning on or after 1 July 2019 instead of 1 January 2019 and add Australian implementation guidance for not-for-profit entities to AASB 9 Financial Instruments and AASB 15. The Institute is reviewing AASB 1058 in conjunction with AASB 15, as above.	1 July 2019	31 December 2020
AASB 2018-7 Amendments to Australian Accounting Standards – Definition of Material These amendments are intended to address concerns that the wording in the definition of 'material' was different in the Conceptual Framework for Financial Reporting, AASB 101 Presentation of Financial Statements and AASB 108 Accounting Policies, Changes in Accounting Estimates and Errors. The amendments address these concerns by: • Replacing the term 'could influence' with 'could reasonably be expected to influence' • Including the concept of 'obscuring information' alongside the concepts of 'omitting' and 'misstating' information in the definition of material • Clarifying that the users to which the definition refers are the primary users of general purpose financial statements referred to in the Conceptual Framework • Aligning the definition of material across IFRS Standards and other publications.	1 January 2020	31 December 2020
AASB 17 Insurance Contracts AASB 17 measures insurance contracts either under the general model or a simplified version of this called the 'premium allocation approach'. The general model is defined such that at initial recognition an entity measures a group of contracts at the total of (a) the amount of fulfilment cash flows, which comprise probability-weighted estimates of future cash flows, an adjustment to reflect the time value of money and the financial risks associated with those future cash flows and a risk adjustment for non-financial risk; and (b) the contractual service margin. On subsequent measurement, the carrying amount of a group of insurance contracts at the end of each reporting period is the sum of the liability for remaining coverage and the liability for incurred claims. The liability for remaining coverage comprises the fulfilment cash flows related to future services and the contractual service margin of the group at that date. The liability for incurred claims is measured as the fulfilment cash flows related to past services allocated to the group at that date. An entity may simplify the measurement of the liability for remaining coverage of a group of insurance contracts using the premium allocation approach on the condition that, at initial recognition, the entity reasonably expects that doing so would produce a reasonable approximation of the general model, or the coverage period of each contract in the group is one year or less.	1 January 2021	31 December 2021
AASB 2014-10 Amendments to Australian Accounting Standards – Sale or Contribution of Assets between an Investor and its Associate or Joint Venture, AASB 2015-10 Amendments to Australian Accounting Standards – Effective Date of Amendments to AASB 10 and AASB 128, AASB 2017-5 Amendments to Australian Accounting Standards – Effective Date of Amendments to AASB 10 and AASB 128 and Editorial Corrections Addresses a conflict between the requirements of AASB 128 Investments in Associates and Joint Ventures and AASB 10 Consolidated Financial Statements and clarifies that in a transaction involving an associate or joint venture, the extent of gain or loss recognised depends on whether the assets sold or contributed constitute a business.	1 January 2021	31 December 2021

2. Income	2019 $'000	2018 $'000
The following has been prepared in support of the items of income shown in the statement of profit or loss and other comprehensive income.		
Investment income from investments received during the period:		
Recognised in surplus or deficit:		
Dividends and distributions income on financial assets	19,783	22,792
Interest income on financial assets	7,332	9,736
Realised foreign exchange gain / (loss)	407	2,550
	27,522	**35,078**
Less transfer to grants and fellowships	(3,366)	(5,015)
Total as per statement of profit or loss and other comprehensive income	**24,156**	**30,063**

3. Other income		
Gain / (Loss) on sale of investments	297	2
Total other income	**297**	**2**

4. Operating expenses		
The following items of expense are included in the net surplus		
Employee benefits expense		
Employee benefits expense	98,341	90,493
Depreciation of non-current property, plant and equipment		
Buildings	5,275	5,091
Plant and equipment	5,536	4,203
Furniture and fittings	75	74
Total depreciation	**10,886**	**9,368**
Operating lease		
Operating lease expense	-	32

5. Venetoclax monetisation

On 14 June 2017, the Institute entered into an agreement with CPPIB Credit Europe S.à r.l., a wholly owned subsidiary of Canada Pension Plan Investment Board (CPP Investments), for the partial sale of royalty rights in an anti-cancer treatment known as Venetoclax. Venetoclax is the result of a research collaboration with Genentech, a member of the Roche Group, and Abbvie and is based on ground-breaking scientific discoveries made at the Institute over three decades ago.

The monetisation arrangement resulted in a transaction that included a cash payment of US$250 million upfront and potential future milestone payments of up to US$75 million. The upfront cash payment was recognised as income in the statement of profit or loss and other comprehensive income for the year ended 31 December 2017. A number of significant costs associated with the monetisation income were also included in the statement of profit or loss and on the statement of financial position.

During the year the Institute recognised the following monetisation income and associated costs:

Royalties Earned	**35,633**	**-**
Less associated costs:		
Provision for commercial income distributions and associated payments	(10,104)	(4,755)
Net Monetisation income	**25,529**	**(4,755)**

Royalty income earned for 2019 was converted to Australian dollars using the spot rate as at 31 December 2019. As at the date of invoice (27 February 2020) an unrealised foreign exchange gain of $2,373,000 existed. The funds are expected to be received in March 2020 and a realised gain/loss will be recorded upon receipt, which will be reflected in the 2020 statement of profit or loss.

As a result of the Venetoclax monetisation transaction and the Institute's net commercial income policy, commitments for payments to employees may be payable in future years, subject to Board approval. The nominal amount of the future commitments is $16,500,000. Refer to note 13 for further details.

6. Directors' remuneration

The directors of the Walter and Eliza Hall Institute of Medical Research during the period were:

CW Thomas	P Collins	C Kilpatrick	TF Moran
JS Hemstritch	P Connolly	J McCluskey	JS Savill
RH Wylie	J Dyson	ME McDonald	C Viney
MW Broomhead	S Kapur	GF Mitchell	

The aggregate income paid or payable, or otherwise made available, in respect of the financial period, to all directors of the Institute, directly or indirectly, by the company or by any related party was nil (2018: nil).

Aggregate retirement benefits paid to all directors of the Institute, by the Institute or by any related party was nil (2018: nil).

7. Auditors' remuneration	Note	2019 $	2018 $
Auditing the financial report		65,000	61,800
Non audit services*		246,947	366,732
		311,947	**428,532**

* During the year, Deloitte were engaged to provide workplace relations advice and other minor engagements.

8. Current assets		2019 $'000	2018 $'000
(a) Current tax assets			
Franking credits receivable		2,377	5,778
Current tax asset / (liability)		(1,137)	(500)
		1,240	**5,278**
(b) Trade and other receivables*			
Sundry debtors		9,072	2,369
Accrued income		6,668	10,858
Royalty Income receivable (monetisation)	5	35,633	-
		51,373	**13,227**
Allowance for credit losses**		(62)	(191)
		51,311	**13,036**

* Trade and other receivables are measured at amortised cost

** Movement in the allowance for credit losses		
Balance at beginning of the year	191	3
Impairment losses recognised	62	191
Amounts written off during the year as uncollectible	(191)	-
Impairment losses reversed	-	(3)
Balance at end of the year	**62**	**191**

** Impairment expense		
Allowance for credit losses credit / (expense)	62	(188)

The Institute always measures the loss allowance for trade receivables at an amount equal to the lifetime expected credit loss (ECL). The expected credit losses on trade receivables are estimated using a provision matrix by reference to past default experience of the debtor and analysis of the debtors current financial position, adjusted for factors that are specific to the debtors general economic conditions of the industry in which the debtors operate and assessment of both the current as well as forecast direction of conditions at the reporting date.

The Institute writes off a trade receivable when there is information indicating that the debtor is in severe financial difficulty and there is no realistic prospect of recovery.

9. Operating leases

Operating leases relate to research facilities with lease terms of between 5 to 99 years, with an option to extend. All operating lease contracts contain market review clauses in the event that the Institute exercises its option to renew. The Institute does not have an option to purchase the leased asset at the expiry of the lease period. The operating leases are prepaid.

	2019	2018
	$'000	$'000
Non-cancellable operating leases		
Not longer than 1 year	-	32
Longer than 1 year and not longer than 5 years	-	128
Longer than 5 years	-	2,416
	-	**2,576**

As part of the implementation of AASB 16, prepaid operating leases have been reclassified to right of use assets from 1 January 2019.

10. Other financial assets

Investments in debt instruments classified as FVOCI		
Corporate bonds	138,866	147,991
Investments in equity instruments designated as at FVOCI		
Domestic equities	227,809	197,354
International equities	86,846	44,129
Other Investments classified as FVTPL		
International managed fund	14,884	11,823
Hybrid instruments	77,202	62,149
Total Investments	**545,607**	**463,446**
Investments in associates		
Unquoted shares	2,034	2,067
Total Investments	**547,641**	**465,513**

(a) Fair value measurements recognised in the statement of financial position

The following table provides an analysis of financial instruments that are measured subsequent to initial recognition at fair value, grouped into levels 1 to 3 based on:

- Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities.
- Level 2 fair value measurements are those derived from inputs other than those quoted prices included within level 1 that are observable for the asset, either directly (i.e. as prices) or indirectly (i.e. derived from prices)
- Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset that are not based on observable market data

	Level 1	Level 2	Level 3	31 December 2019 Total
Financial assets measured at fair value	$'000	$'000	$'000	$'000
Quoted shares	329,539	-	-	329,539
Floating rate securities	77,202	122,851	-	200,053
Fixed rate securities	-	16,015	-	16,015
Unquoted shares*	-	-	2,034	2,034
Total	**406,741**	**138,866**	**2,034**	**547,641**

*As at 31 December 2019, the Institute held a 49% (2018: 49%) share of equity in Catalyst Therapeutics Pty Ltd, with a carrying value of $597,000 (2018: $305,000). Anaxis Pharma Pty Ltd is a wholly owned subsidiary of Catalyst Therapeutics Pty Ltd. The Institute also held a 48.5% (2018: 48.5%) share of the equity in Murigen Pty Ltd, with a carrying value of nil. (2018: $$113,000). The Institute's investment in VCCC is detailed in note 25.

(b) Reconciliation of level 3 fair value measurements of financial assets

	Unquoted equities	
	2019	2018
	$'000	$'000
Opening balance	2,067	1,781
Purchases	-	-
Impairment	-	-
Revaluation	(33)	286
Closing balance	**2,034**	**2,067**

11. Property, plant and equipment

	Buildings	Work in progress	Plant and equipment	Furniture and fittings	Land Lease	Total
	$'000	$'000	$'000	$'000	$'000	$'000
Gross carrying amount						
Balance at 1 January 2018	181,384	8,807	62,488	2,047	16,200	270,926
Additions at cost	-	22,029	-	-	-	22,029
Transfers	9,146	(17,050)	7,904	-	-	-
Disposals	-	-	(7,304)	-	-	(7,304)
Balance at 31 December 2018	**190,530**	**13,786**	**63,088**	**2,047**	**16,200**	**285,651**
Additions at cost	-	12,252	-	-	-	12,252
Transfers	3,661	(21,534)	17,667	91	-	(115)
Disposals	(83)	-	(5,725)	-	-	(5,808)
Reclassification to Equity	-	-	-	-	(16,200)	(16,200)
Balance at 31 December 2019	**194,108**	**4,504**	**75,030**	**2,138**	**-**	**275,780**
Accumulated depreciation						
Balance at 1 January 2018	(41,878)	-	(39,899)	(1,548)	-	(83,325)
Disposals	-	-	6,199	-	-	6,199
Depreciation expense	(5,091)	-	(4,203)	(74)	-	(9,368)
Balance at 31 December 2018	**(46,969)**	**-**	**(37,903)**	**(1,622)**	**-**	**(86,494)**
Disposals	-	-	5,519	-	-	5,519
Depreciation expense	(5,275)	-	(5,536)	(75)	-	(10,886)
Balance at 31 December 2019	**(52,244)**	**-**	**(37,920)**	**(1,697)**	**-**	**(91,861)**
Carrying amounts						
As at 31 December 2018	**143,561**	**13,786**	**25,185**	**425**	**16,200**	**199,157**
As at 31 December 2019	**141,864**	**4,504**	**37,110**	**441**	**-**	**183,919**

Aggregate depreciation allocated, whether recognised as an expense or capitalised as part of the carrying amount of other assets during the period:

	2019	2018
	$'000	$'000
Buildings	5,275	5,091
Plant and equipment	5,536	4,203
Furniture and fittings	75	74
Total depreciation	**10,886**	**9,368**

	2019 $'000	2018 $'000
12. Trade and other payables		
Trade creditors	1,274	3,474
Accrued expenses	8,813	11,265
	10,087	**14,739**
13. Provisions		
The aggregate provisions recognised and included in the financial statements are as follows:		
Provision for net commercial income distribution and associated payments	16,082	10,396
Provision for employee benefits*	21,770	18,282
Current provisions	**37,852**	**28,678**
Provision for employee benefits	2,204	2,723
Provision for net commercial income distribution and associated payments	32,660	33,040
Non current provisions	**34,864**	**35,763**
	72,716	**64,441**

* Included in current employee provisions are $13,690,000 (2018: $10,737,000) of long service leave for which a current entitlement exists.

As a result of the Venetoclax monetisation transaction and the Institute's net commerical income distribution policy relating to distributions to employees, commitments may be payable in future years.

The extent to which an outflow of funds under these commitments, will be required is dependent on staff members remaining employed by the Institute, the number of eligible employees within the distribution period and Board approval.

The Institute finalised its net commerical income distribution policy in 2018, which resulted in an increase to the nominal amounts that may be payable in future years (no amount has been recognised as a liability) below:

Potential payments by the Institute arising from royalty distributions to staff:		
Payable within 1 year	1,500	1,500
Payable between 1-5 years	6,000	6,000
Payable 5+ years	9,000	10,500
	16,500	**18,000**
Number of employees at end of financial period (full time equivalents)		
Staff	737	716
Visiting scientists	34	36
	771	**752**
14. Unearned grants and fellowships		
Grants and fellowships already committed and applicable to future periods:		
Grants	26,074	13,831
Fellowships	8,996	1,390
	35,070	15,221
Contract Liabilities		
Grants and fellowships already committed and applicable to future periods:		
Capital Grants	14,861	-
Total unearned grants and fellowships	**49,931**	**15,221**
15. Other liabilities		
Monies Held in Trust:		
Staff Salary Packaging deposits	264	270
	264	**270**

16. Capital movements		2019 $'000	2018 $'000
(a) The net surplus for the financial period is $21,112,000 (2018: surplus $11,344,000)			
This has been appropriated as follows:	Note		
Transfer to Permanent Invested Fund	16(b)	4,652	8,571
Transfer from General Fund	16(c)	7,757	(3,282)
Transfer to Royalty Fund	16(d)	6,985	3,644
Transfer to Leadership Fund	16(e)	1,408	1,995
Transfer to Discovery Fund	16(f)	310	416
Total appropriations to funds		**21,112**	**11,344**
(b) Permanent Invested Fund			
Balance at beginning of period		194,181	185,610
Net surplus for period transferred from statement of profit or loss and other comprehensive income		4,652	8,571
Total Permanent Invested Fund		**198,833**	**194,181**
(c) General Fund			
Balance at beginning of period		377,710	378,204
Equity transfer on initial adoption of AASB 16		(16,182)	-
Equity transfer on initial adoption of AASB 9		-	7,969
Transfers from Investment revaluation reserve on sale of investment		1,908	(5,181)
Net surplus for period transferred from statement of profit or loss and other comprehensive income		7,757	(3,282)
Total General Fund		**371,193**	**377,710**
(d) Royalty Fund			
Balance at beginning of period		48,054	44,410
Net surplus for period transferred from statement of profit or loss and other comprehensive income		6,985	3,644
Total Royalty Fund		**55,039**	**48,054**
(e) Leadership Fund			
Balance at beginning of period		26,557	24,562
Net surplus for period transferred from statement of profit or loss and other comprehensive income		1,408	1,995
Total Leadership Fund		**27,965**	**26,557**
(f) Discovery Fund			
Balance at beginning of period		4,961	4,545
Net surplus for period transferred from statement of profit or loss and other comprehensive income		310	416
Total Discovery Fund		**5,271**	**4,961**
(g) Investment revaluation reserve			
Balance at beginning of period		8,211	40,853
Equity transfer on initial adoption of AASB 9		-	(7,969)
Valuation gain/(loss) recognised for the period (FVTOCI equity Instruments)		59,682	(28,996)
Valuation gain/(loss) recognised for the period (FVTOCI debt Instruments)		1,508	(858)
Transfers to profit and loss on sale of investments (FVTOCI debt Instruments)		(293)	
Transfers to general funds on sale of investments (FVTOCI equity Instruments)		(1,908)	5,181
Total investment revaluation reserve		**67,200**	**8,211**
Total funds		**725,501**	**659,674**

17. Notes to statement of cash flows

	2019 $'000	2018 $'000
(a) Reconciliation of cash		
For the purposes of the statement of cash flows, cash includes cash on hand, cash at bank, monies held at trust (salary packaging bank account for staff) and investments in money market instruments, net of outstanding bank overdrafts.		
Cash at the end of the financial period as shown in the statement of cash flows is reconciled to the related items in the statement of financial position as follows:		
Cash	20,368	23,278
Deposits at call	21,279	44,465
Term Deposits	28,335	-
	69,982	**67,743**
Represented by:		
Cash for Institute operations (as per Cash Flow Statement)	69,163	67,473
Cash balances not available for use		
Monies Held in Trust - Staff Salary Packaging Deposits	819	270
	69,982	**67,743**
(b) Reconciliation of net surplus / (deficit) to net cash flows from operating activities		
Net surplus / (deficit)	21,112	11,344
Depreciation	10,941	9,368
Gain on disposal of property, plant and equipment	26	248
Donations and bequests moved to Permanent funds	(1,359)	(6,510)
Gain / (Loss) on sale of investments	(297)	(2)
Fair value adjustment for investments (FVTPL)	(5,261)	589
Increase in investments – dividend reinvestment plans	(12)	(5)
Grants and donations for capital works	(5,076)	(1,198)
Donated financial assets	-	(3)
Prepaid operating leases	-	32
	20,074	**13,863**
Changes in net assets and liabilities:		
(Increase) / decrease in assets:		
Tax assets	3,401	(3,749)
Sundry debtors and prepayments	(7,428)	1,101
Income receivable	(31,441)	(7,457)
Monies Held in Trust	(555)	-
Foreign exchange gain/loss	477	(4,998)
Increase / (decrease) in liabilities:		
Trade payables	(2,232)	(55)
Accrued expenses	(2,452)	4,618
Tax liabilities	637	(142)
Current provisions	9,174	5,086
Other current liabilities (Grants)	34,710	(8,122)
Non-current provisions	(899)	(6,108)
Net cash provided / (used) from operating activities	**23,466**	**(5,963)**

(c) Non-cash financing and investing activities

During the financial period:

Dividends of $12,225 (2018: $5,247) were reinvested as part of dividend and distribution reinvestment plans.

18. Right of use assets	31 December 2019 $'000	31 December 2018 $'000
Carrying amounts		
Buildings		-
At cost	3,200	
Accumulated depreciation	(638)	-
	2,562	**-**
Equipment		
At cost	198	
Accumulated depreciation	(24)	-
	174	**-**
Total	**2,736**	**-**
Depreciation		
Buildings	31	-
Equipment	24	-
Total depreciation	**55**	**-**

Low value and short term leases

For short-term leases (lease term of 12 months or less) and leases of low-value assets, the Institute has opted to recognise a lease expense on a straight-line basis as permitted by AASB 16. The total expense relating to low value and short term leases is as follows:

Low value leases	11	-
Short term leases	-	-
Total	**11**	**-**

19. Economic dependency

The Institute is reliant upon grants from the Australian Government National Health and Medical Research Council for 27.7% of operating expenditure (2018: 32.3%) and the Victorian Government Department of Health and Human Services, Department of State Development, Business and Innovation for 6.4% of operating expenditure (2018: 7.2%) for support of its basic research activities.

20. Segment information

The Institute is a medical research organisation focussed on the nationally and globally significant areas of health being cancer, immune disorders and infectious diseases. All operations are predominantly in Australia.

21. Capital expenditure commitments	2019 $'000	2018 $'000
Not longer than 1 year	4,173	2,885
Total commitments	**4,173**	**2,885**

22. Related party disclosures

(a) Transactions with associates

The Institute received fees during the year from Catalyst Therapeutics Pty Ltd and Anaxis Pharma Pty Ltd totalling $2,177,602 (2018: $2,358,999) for services rendered on normal commercial terms.

The Institute did not receive any royalties during the year from Anaxis Pharma Pty Ltd (2018: $1,357,019).

The Institute provided a loan of $25,000 to Murigen Pty Ltd (2018: nil)

The Institute made membership contributions to the Victorian Comprehensive Cancer Centre (VCCC) totalling $137,091 (2018: $135,921).

The Institute also received fees from the VCCC for collaborate initiatives undertaken during the year of $618,594 (2018: $831,383)

(b) Transactions with directors and director-related entities

During the year various Directors and Director-related entities made donations to the Institute totalling $472,250 (2018: $860,000).

(c) Compensation for key management personnel	2019 $	2018 $
The aggregate compensation of the key management personnel of the Institute is set out below:		
Short-term employee benefits	1,862,306	1,826,243
Post-tax employment benefits	334,975	311,461
	2,197,281	**2,137,704**

23. Superannuation commitments

(a) Institute employees are members of a range of superannuation funds, which are divided into the following categories:

Those operative and open to membership by new employees:

UniSuper – Accumulation Super (1)

Other superannuation funds chosen by employees.

Those closed to future membership by Institute employees:

Unisuper – Defined Benefit Division

Unisuper – Accumulation Super (2)

(b) UniSuper plans

UniSuper is a multi employer superannuation fund operated by UniSuper Limited as the corporate trustee and administrated by UniSuper Management Pty Ltd, a wholly owned subsidiary of UniSuper Limited. The operations of UniSuper are regulated by the Superannuation Industry (Supervision) Act 1993.

(i) The UniSuper schemes known as the Defined Benefit Division or Accumulation Super (2) were only available to contributing members of the Walter and Eliza Hall Institute of Medical Research Superannuation Fund (1979) which closed in 2003.

(ii) The maximum contribution rate to the schemes is 25.25% of member's salary of which the member contributes 8.25% after tax and the Institute 17%.

(iii) UniSuper has advised that the Accumulation Super (2) and Defined Benefit Division plans are defined as multi-employer defined contribution schemes in accordance with AASB 119 Employee Benefits. AASB 119 Employee Benefits states that this is appropriate for a defined benefit plan where the employer does not have access to the information required and there is no reliable basis for allocating the benefits, liabilities, assets and costs between employers.

(iv) The number of members of the Walter and Eliza Hall Institute of Medical Research Superannuation Fund (1979) who became members of the UniSuper – Defined Benefit Division when the fund closed in 2003 was 204. The number of Institute employees who are members of the Defined Benefit Division as at 31 December 2019 was 73 (2018: 78).

(v) New employees who commenced after 1 July 2003 currently have a minimum contribution of 9.5% of their annual salary contributed by the Institute to Accumulation Super (1) or to a fund of their choice prescribed under the Superannuation Guarantee Charge Act (1992).

(c) The total superannuation contributions by the Institute during the period in respect to the above plans were:	**2019 $'000**	**2018 $'000**
UniSuper – Defined Benefit Division	1,560	1,564
UniSuper – Accumulation Super (2)	354	335
UniSuper – Accumulation Super (1)	7,606	6,953
Other superannuation funds	1,262	960
Total	**10,782**	**9,812**

24. Financial instruments

(a) Significant accounting policies

Details of the significant accounting policies and methods adopted, including the criteria for recognition, the basis of measurement and the basis on which revenues and expenses are recognised, in respect of each class of financial asset and financial liability are disclosed in note 1 to the financial statements.

(b) Significant terms, conditions and objectives of derivative financial instruments

The Institute does not enter into trade derivative financial instruments.

(c) Capital risk management

The Institute manages its capital to ensure it will be able to continue as a going concern whilst maximising its return on investment within the risk profile maintained by the Institute. The capital structure consists of permanent funds, retained earnings and reserves.

(d) Financial risk management

The Institute minimises financial risk through the charter given to the investment sub-committee. In line with this charter, the Institute invests short term funds in an appropriate combination of fixed and floating instruments.

(e) Interest rate risk management

The Institute is exposed to interest rate risk as it invests funds at both fixed and floating interest rates. The majority of financial assets in this class are bank accounts, bank bills and fixed interest securities with varying interest rates.

(f) Interest rate sensitivity analysis

The sensitivity analysis below has been determined based on the exposure to interest rates at the reporting date and the stipulated change taking place at the beginning of the financial year and held constant throughout the reporting period. A 25 basis point variation was used as the minimum point and 100 basis point variation as the maximum point. This is consistent with the management's view of interest rate sensitivity. A change in interest rates would impact net surplus as follows:

Interest rate risk	Minimum 25bp (+/-)		Maximum 100bp (+/-)	
	Dec-19	Dec-18	Dec-19	Dec-18
	$000's	$000's	$000's	$000's
Effect on surplus - rate decrease	(675)	(658)	(2,700)	(2,634)
Effect on surplus - rate increase	675	658	2,700	2,634

(g) Equity price sensitivity analysis

The sensitivity analysis below has been determined based on the exposure to equity price risks at the reporting date.

At reporting date, if the equity prices had been 5% higher or lower:

- net surplus for the year ended 31 December 2019 would have been unaffected as the equity investments are classified as not held for trading and the fair value through other comprehensive (FVTOCI) election has been made under AASB 9.
- investment revaluation reserve would increase or decrease by $15,800,000 (Dec 2018: $12,200,000) mainly as a result of the changes in fair value of these equity investments.

The Institute's sensitivity to equity prices has not changed significantly from the prior year.

(h) Credit risk management

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in a financial loss to the Institute. The Institute has adopted a policy of only dealing with creditworthy counter parties as a means of mitigating the risk of financial loss from defaults. The Institute's exposure is continuously monitored and reviewed. Trade receivables consist of a large number of customers including granting bodies. The Institute does not have a significant credit exposure to any single party or any group of counter parties having similar characteristics. The carrying amount of financial assets recorded in the financial statements represents the Institute's maximum exposure to credit risk.

(i) Liquidity risk management

Ultimate responsibility for liquidity risk management rests with the board of directors, who have built an appropriate risk management framework for the management of the Institute's short, medium and long-term funding and liquidity management. The Institute manages the liquidity risk by maintaining adequate cash reserves, and by continuously monitoring forecast and actual cash flows while matching the maturity profiles of financial assets. Given the current surplus cash assets, liquidity risk is minimal. The Institute does not have any interest bearing liabilities. The remaining contractual maturity for its non-interest-bearing financial liabilities is $10,087,000 payable within 3 months of 31 Dec 2019 (2018: $14,739,000).

(j) Fair value

The carrying amount of the Institute's financial assets and financial liabilities recorded in the financial statements approximates their fair values. The fair value of financial assets with standard terms and conditions and traded on active liquid markets are determined with reference to quoted market prices.

(k) Interest rate risk

The following table details the Institute's exposure to interest rate risk as at 31 Dec 2019 and 31 Dec 2018.

	Average interest rate	Variable interest rate	Less than 1 year	1 to 5 years	More than 5 years	Non-Interest Bearing	TOTAL
31 December 2019		$'000	$'000	$'000	$'000	$'000	$'000
Financial assets							
Cash and cash equivalents	0.74%	41,647	-	-	-	-	41,647
Tax assets		-	-	-	-	1,240	1,240
Sundry debtors		-	-	-	-	9,010	9,010
Prepayments		-	-	-	-	1,670	1,670
Accrued income		-	-	-	-	42,301	42,301
Term Deposits	1.92%	-	28,335	-	-	-	28,335
Shares		-	-	-	-	329,538	329,538
Floating rate securities	2.76%	-	24,846	117,906	57,302	-	200,054
Fixed rate securities	3.74%		1,522	9,080	5,413	-	16,015
Non listed shares		-	-	-	-	2,034	2,034
		41,647	**54,703**	**126,986**	**62,715**	**385,793**	**671,844**
Financial liabilities							
Trade payables		-	-	-	-	10,087	10,087
Other liabilities		-	-	-	-	264	264
Grants carried forward		-	-	-	-	49,931	49,931
		-	**-**	**-**	**-**	**60,282**	**60,282**

	Average interest rate	Variable interest rate	Less than 1 year	1 to 5 years	More than 5 years	Non-Interest Bearing	TOTAL
31 December 2018		$'000	$'000	$'000	$'000	$'000	$'000
Financial assets							
Cash and cash equivalents	1.54%	67,743	-	-	-	-	67,743
Tax assets		-	-	-	-	5,278	5,278
Sundry debtors		-	-	-	-	2,178	2,178
Prepayments		-	-	-	-	1,042	1,042
Accrued income		-	-	-	-	10,858	10,858
Shares		-	-	-	-	253,305	253,305
Floating rate securities	3.75%	-	14,599	119,318	61,423	-	195,340
Fixed rate securities	4.11%		1,031	5,621	8,148	-	14,800
Non listed shares		-	-	-	-	2,067	2,067
		67,743	**15,630**	**124,939**	**69,571**	**274,728**	**552,611**
Financial liabilities							
Trade payables		-	-	-	-	14,739	14,739
Other liabilities		-	-	-	-	270	270
Grants carried forward		-	-	-	-	15,221	15,221
		-	**-**	**-**	**-**	**30,230**	**30,230**

23. Superannuation commitments

(a) Institute employees are members of a range of superannuation funds, which are divided into the following categories:

Those operative and open to membership by new employees:

UniSuper – Accumulation Super (1)

Other superannuation funds chosen by employees.

Those closed to future membership by Institute employees:

Unisuper – Defined Benefit Division

Unisuper – Accumulation Super (2)

(b) UniSuper plans

UniSuper is a multi employer superannuation fund operated by UniSuper Limited as the corporate trustee and administrated by UniSuper Management Pty Ltd, a wholly owned subsidiary of UniSuper Limited. The operations of UniSuper are regulated by the Superannuation Industry (Supervision) Act 1993.

(i) The UniSuper schemes known as the Defined Benefit Division or Accumulation Super (2) were only available to contributing members of the Walter and Eliza Hall Institute of Medical Research Superannuation Fund (1979) which closed in 2003.

(ii) The maximum contribution rate to the schemes is 25.25% of member's salary of which the member contributes 8.25% after tax and the Institute 17%.

(iii) UniSuper has advised that the Accumulation Super (2) and Defined Benefit Division plans are defined as multi-employer defined contribution schemes in accordance with AASB 119 Employee Benefits. AASB 119 Employee Benefits states that this is appropriate for a defined benefit plan where the employer does not have access to the information required and there is no reliable basis for allocating the benefits, liabilities, assets and costs between employers.

(iv) The number of members of the Walter and Eliza Hall Institute of Medical Research Superannuation Fund (1979) who became members of the UniSuper – Defined Benefit Division when the fund closed in 2003 was 204. The number of Institute employees who are members of the Defined Benefit Division as at 31 December 2019 was 73 (2018: 78).

(v) New employees who commenced after 1 July 2003 currently have a minimum contribution of 9.5% of their annual salary contributed by the Institute to Accumulation Super (1) or to a fund of their choice prescribed under the Superannuation Guarantee Charge Act (1992).

(c) The total superannuation contributions by the Institute during the period in respect to the above plans were:	**2019 $'000**	**2018 $'000**
UniSuper – Defined Benefit Division	1,560	1,564
UniSuper – Accumulation Super (2)	354	335
UniSuper – Accumulation Super (1)	7,606	6,953
Other superannuation funds	1,262	960
Total	**10,782**	**9,812**

26. Concessionary Leases

Lease	Description of underlying assets	Lease payments	Lease term	The Institute's dependence on leases to further its objectives	Restrictions on the use of the underlying assets specific to the Institute
Parkville crown land	The sub-lease was entered into on 23 Nov 2011 between Department of Health (Head landlord), and Melbourne Health (Landlord) and the Institute (Tenant). The Department of Health leases Parkville crown land to Melbourne Health for 99 years. Melbourne Health leases Parkville crown land to the Institute for 99 years payable on demand.	$104 per annum, payable on demand	99 years	The lease provides the land on which the Institute was built to perform medical research.	The crown land is used only for community purposes.
Early Learning and Child Care Centre land *	The sub-lease was entered into on 31 August 2018 between Department of Health (Head landlord), and Melbourne Health (Landlord) and the Institute (Tenant). The Department of Health leases the land (196 m2 in area at ground level) to Melbourne Health. Melbourne Health leases Parkville crown land to the Institute, payable on demand.	$104 per annum, payable on demand	21 years	The lease provides the land on which the Early Learning and Child Care Centre was built. This centre was constructed to address one of the most significant barriers to an ongoing career and advancement at the Institute, being access to adequate childcare.	The crown land is used only for community purposes.
Bundoora*	La Trobe University leased on 31 March 2000 the former Rio Tinto Building at La Trobe University Campus, Bundoora to the Institute.	$6.25M – paid upfront	99 years	The lease provides the premises for medical research and animal facilities for the Bundoora campus.	Assignment, sublease, mortgage or license is not permitted without La Trobe University's consent.
Wards 8 North and 8 East RMH	Melbourne Health (Landlord) commenced the lease on 16 March 2015 for the areas located on the 8th floor, main block of The Royal Melbourne Hospital to the Institute (Tenant).	Nil per annum	6 years	The lease provides the area on which the Institute is located to perform medical research in conjuction with the Hospital.	Assignment, sublease, mortgage or license is not permitted without Melbourne Health's consent.
Ward 7 north RMH	Melbourne Health (Landlord) commenced the lease on 10 June 2011 for the premises on the plan known as "Ward 7 North" of the The Royal Melbourne Hospital to the Institute (Tenant). The rent is payable on demand.	$1 per annum, payable on demand	21 years	The lease provides the area on which the Institute is located to perform medical research in conjuction with the Hospital.	Assignment, sublease, mortgage or license is not permitted without Melbourne Health's consent.

* The following concessionary leases are subject to sub-lease arrangements with third parties.

27. Events after the reporting period

On 30 January 2020 the spread of novel coronavirus (COVID-19) was declared a public health emergency by the World Health Organisation. As this declaration was made after the reporting period, the Institute does not believe it constitutes an 'Adjusting Event' as defined in AASB 110. The Institute will continue to monitor the impact of COVID-19, but at the date of this report it is too early to determine the full impact this virus may have on the Institute. The Institute has made an early assessment of the expected financial impacts of this situation and is confident our going concern status is not affected. Should this public health emergency continue for a prolonged period of time this has the potential to have a material adverse financial impact on the Institute.

The COVID-19 outbreak has resulted in significant downturn in the global share markets. This has had a material impact on the market value of the Institute's investment portfolio since 31 December 2019.

The current market value as at 26 March 2020 in comparison to 31 December 2019 is shown below:

	Market Value	
Investment	**31 December 2019**	**26 March 2020**
	$'000	**$'000**
Corporate bonds	138,866	134,075
Domestic equities	227,809	179,680
International equities	86,846	89,809
International managed fund	14,884	13,332
Hybrid instruments	77,202	69,423
Total Market value	**545,607**	**486,319**

Governance statement

The Walter and Eliza Hall Institute of Medical Research is a Public Company Limited by Guarantee registered with the ACNC. The Institute abides by the ACNC Governance Statement.

Ultimate responsibility for the governance of the Institute rests with the Board of Directors. This Governance Statement outlines how the Board meets that responsibility.

Achieving the Mission

The Board's primary role is to ensure that the Institute's activities are directed towards achieving its mission of 'Mastery of Disease through Discovery'. The Board must ensure that this mission is achieved in the most efficient and effective way.

Specific Responsibilities of the Board

The Board fulfils its primary role by:

- selecting, appointing, guiding and monitoring the performance of the Institute Director;
- formulating the Institute's strategic plan in conjunction with the Chief Executive and Senior Management;
- approving operating and capital budgets formulated by the Institute Director and Management;
- monitoring Management's progress in achieving the Strategic Plan;
- monitoring Management's adherence to operating and capital budgets;
- ensuring the integrity of internal control, risk management and management information systems;
- ensuring stakeholders receive regular reports, including financial reports;
- ensuring the Company complies with relevant legislation and regulations; and
- acting as an advocate for the Institute whenever and wherever possible.

Management's Responsibility

The Institute's day-to-day operations and administration are the responsibility of the Institute Director and Executive Management.

Board Oversight

The Board oversees and monitors Management's performance by:

- meeting at least four times during the year;
- receiving detailed financial and other reports from management at these meetings;
- receiving additional information and input from management when necessary; and
- assigning to the Audit and Risk, Commercialisation and Investment Committees of the Board responsibility to oversee aspects of the Institute's operations and administration.

Each Board Committee operates under a Terms of Reference or a Charter approved by the Board. These are reviewed and updated as necessary.

Board Members

All Board Members are Non-Executive Directors and receive no remuneration for their services. The Company's Constitution specifies:

- there must be no less than 12 and no more than 18 Directors;
- Directors (except those appointed by The University of Melbourne) are appointed for a maximum of four terms of three years each, after which Directors may be reappointed annually with the unanimous agreement of all other Board Members; and
- the President or Vice President may hold office for an additional period or periods not exceeding six years.

Appointments to the Board are made to ensure the Board has the right mix of skills, experience and expertise. One Board Member is appointed by the Trustees of the Institute and four Board Members are appointed by the Company's founding members, The University of Melbourne and The Royal Melbourne Hospital (Melbourne Health) (two members each) and up to a further 13 by the Board.

Board and Committee Members receive advice of the terms and conditions of their appointment. Board and Committee Members' knowledge of the business is maintained by visits to the Institute's operations and management presentations.

The performance of individual Board and Committee Members and the Board and Board Committees is assessed regularly.

Risk Management

The Board oversees the Institute's risk management system, which is designed to protect the Organisation's reputation and manage those risks that might preclude it from achieving its goals.

Management is responsible for establishing and implementing the risk management system, which assesses monitors and manages operational, financial reporting and compliance risks. The Audit and Risk Committee is responsible for monitoring the effectiveness of the risk management system between annual reviews.

Ethical Standards and Code of Conduct

Board Members, Senior Executives and staff are expected to comply with relevant laws and the codes of conduct of relevant professional and research bodies, and to act consistent with our values and integrity, compassion, fairness and honesty at all times when dealing with colleagues, and others who are stakeholders in our mission.

Involving Stakeholders

The Institute has many stakeholders, including our donors and benefactors, our staff, and students, the broader community, the government agencies who provide us funds and regulate our operations, and our suppliers.

We adopt a consultative approach in dealing with our stakeholders. We get involved in industry forums to ensure governments at all levels are aware of our concerns and our achievements and to remain abreast of industry developments.

Indemnification and Insurance

The Institute insures Directors (and the Company Secretary and Executives) against liabilities for costs and expenses incurred by them in defending any legal proceedings arising out of their conduct while acting in the capacity of Director (or Company Secretary or Executive) of the Company, other than conduct involving a wilful breach of duty in relation to the Company.

Directors' report

The Directors of the Walter and Eliza Hall Institute of Medical Research submit herewith the Annual Financial Report of the Company for the year ended 31 December 2019. In order to comply with the provisions of the Australian Charities and Not-for-Profits Commission Act 2012 the Directors report as follows:

Directors and Board Meetings

The names and particulars of the Directors of the Company during or since the end of the financial year and attendance at Board meetings in the year ended 31 December 2019 are:

		Joined Board	Meetings held while a Director	Meetings Attended
Jane S Hemstritch *Chairperson and President of the Institute* (appointed Chair May 2019)	BSc(Hons) FCA FAICD	2013	5	5
Christopher W Thomas AM *Chairman and President of the Institute* (resigned May 2019)	BCom(Hons) MBA *Melb* FAICD	2001	2	2
Terence F Moran AC *Vice President of the Institute* (appointed May 2019)	BA(Hons) *Latrobe*	2013	5	5
Robert H Wylie *Honorary Treasurer*	FCA FAICD	2014	5	5
Malcolm W Broomhead AO	MBA BE(Civil) *Qld* FIE(Aus) FAusIMM FAIM MICE(UK) FAICD	2014	5	2
John Dyson	BSc *Monash* Grad Dip Fin Inv *SIA* MBA *RMIT*	2016	5	5
James McCluskey AO	BMedSci MBBS MD *UWA* FRACP FRCPA	2011	5	4
Marie McDonald	BSc (Hons) LLB (Hons) *Melbourne*	2016	5	5
Graham F Mitchell AO (resigned May 2019)	RDA BVSc *Syd* FACVSc PhD *Melb* FTSE FAA	2007	2	2
Carolyn Viney	LLB/BA *Monash*	2016	5	4
Shitij Kapur	MBBS, PhD, FRCPC, FMedSci	2017	5	3
Christine Kilpatrick AO	MBBS, MBA, MD, FRACP, FRACMA, FAICD. FAHMS, DMedSci (Hons)	2017	5	4
Pippa Connolly (joined April 2019)	MEng, CPEng, FIEAust, GAICD	April 2019	5	5
Peter Collins	BA(Hons) *Melb* BTheolMCD, MBA *Oxford* and HEC *Paris*	2018	5	5
Sir John Savill	BA *Oxford* MBChB *Sheffield* PhD *London* FRCP FRCPE FRCSEd (Hon) FRCPCH(Hon) FASN FRSE F.MedSci FRS	2018	5	5

The Audit and Risk Committee

The role of the Audit and Risk Committee is to assist the Board in fulfilling its statutory and fiduciary responsibilities with regard to accounting and financial reporting practices and internal control systems of the Institute. The Committee met four times during the period under review.

Principal Activities

The Institute's principal activity in the course of the financial year was medical research and there has been no significant change in that activity during the financial year.

Financial Results

The financial result from operations was a net surplus of $20,060,000 (31 Dec 2018 net surplus of $13,591,000). After allowing for the gains from the sale of investments and other grants, donations and bequests, depreciation and amortisation the overall result for the period was a surplus of $21,112,000 (31 December 2018 surplus of $11,344,000). Tax is not applicable. The Company is Limited by Guarantee, has no share capital and declares no dividends.

Operations

A review of operations of the Institute is included in the detailed scientific reports.

Environmental Regulations

The Institute aims to achieve a high standard in environmental matters. The Institute complies with the Environmental Protection Act in respect of its operations. Discharges to air and water are below specified levels of contaminants and solid waste is disposed of in an appropriate manner. Biomedical waste and sharps are disposed of through appropriately licensed contractors. The Directors have not received notification nor are they aware of any breaches of environmental laws by the Institute.

Appreciation

The Board wishes to extend its appreciation to the Members of the various Committees (Remuneration and Nomination Committee, Human Research Ethics Committee, Investment Committee, Advocacy and Support Committee, Audit and Risk Committee and the Commercialisation Advisory Committee) as well as the many other people including the Institute Director, staff, students, overseas visitors and honorary workers, who work so tirelessly to advance the Company's world-wide reputation for excellence in medical research. A table of attendance at the various committees is listed below.

Committee attendance	Meetings held while a member	Meetings attended
Audit and Risk Committee		
Mr Robert Wylie (Chair)	4	3
Mr Malcolm Broomhead AO	4	4
Mrs Jane S Hemstritch	2	0
Ms Pippa Connolly (joined August 2019)	2	2
Commercialisation Committee		
Dr Graham Mitchell AO (resigned May 2019)	2	2
Ms Marie McDonald (appointed Chair August 2019)	1	1
Dr Leigh Farrell	3	3
Dr Lisa Hennessey	3	3
Mr Saul Cannon	3	1
Prof. Sir John Savill (joined August 2019)	1	1
Advocacy and Support Committee		
Mr John Dyson (Chair)	4	4
Dr Paul Cooper	4	3
Mr Michael Daddo	4	2
Mr Hugh Hodges	4	3
Ms Caroline Johnston	4	3
Ms Andrea Lapidge	4	4
Ms Catherine Robson	4	3
Remuneration and Nomination Committee		
Mr Christopher Thomas AM (resigned Chair May 2019)	1	1
Mr Terrance Moran AC (appointed Chair August 2019)	1	1
Ms Marie McDonald	1	1
Ms Carolyn Viney (joined August 2019	0	0

Committee attendance	Meetings held while a member	Meetings attended
Human Research Ethics Committee		
Mr Peter Collins (Chair)	5	5
Dr John Bonacci	5	5
Dr Vanessa Bryant	5	3
Rev Father Michael Elligate (Deputy Chair)	5	2
Mr David Freeman	5	5
Mrs Netta McArthur (resigned Feb 2019)	1	1
Ms Moira Rayner (resigned Sept 2019)	3	1
Dr Ian Mejewski	5	4
Prof. Marc Pellegrini	5	4
Dr Jeanne Tie	5	3
Ms Sarah Galbraith (joined September 2019)	2	2
Ms Terri Lourey (joined September 2019)	2	2
Ms Bree Ridgeway (joined April 2019)	4	2
Ms Louise Steinfort (joined April 19)	4	3
Ms Jane Fiske (joined April 2019)	4	3
Investment Committee		
Mr Robert Wylie (Chair)	4	4
Mr Malcom Broomhead AO	4	3
Mr Stephen Merlicek	4	2
Mr Stephen Milburn-Pyle	4	3
Mr Andrew Scott	4	4
Ms Fiona Trafford-Walker	4	2

Auditors' independence declaration

The Auditors' independence declaration is included on page 33 of the financial report.

Other Matters

(a) During the financial year there was no significant change in the Company's state of affairs other than that referred to in the accounts or the notes thereto.

(b) There has not been any other matter or circumstance that has arisen since the end of the financial year, that has significantly affected, or may significantly affect the operations of the Company, the results of those operations, or the state of affairs of the Company in future financial years.

(c) Disclosure of information regarding likely developments in the operations of the Company in future years and the expected results of those operations is likely to result in unreasonable prejudice to the Company. Accordingly, this information has not been disclosed in this report.

(d) During the financial year the Company paid a premium in respect of a contract insuring the Directors and Officers of the Company against liability incurred as such a Director or Officer to the extent permitted by the Corporations Act 2001. The contract of insurance prohibits disclosure of the nature of the liability and the amount of the premium. The Company has not otherwise, during or since the financial year, indemnified or agreed to indemnify an Officer or Auditor of the Company or any related body corporate against a liability incurred as such an Officer or Auditor.

(e) The Company is a Company of the kind referred to in ASIC Class Order 98/100, dated 10 July 1998, and in accordance with that Class Order amounts in the Directors' report and the financial report are rounded off to the nearest thousand dollars.

Signed in accordance with a resolution of the Directors made pursuant to s.298(2) of the Corporations Act 2001.

On behalf of the directors

Jane Hemstritch
President

Robert Wylie
Treasurer

Melbourne, 26 March 2020

Directors' declaration

Directors' Declaration - per section 60.15 of the Australian Charities and Not-for-Profits Commission Regulation 2013.

The Directors declare that in the Directors' opinion:

(a) there are reasonable grounds to believe that the registered entity is able to pay all of its debts, as and when they become due and payable; and;

(b) the financial statements and notes satisfy the requirements of the Australian Charities and Not-for-Profits Commission Act 2012.

Signed in accordance with subsection 60.15(2) of the Australian Charities and Not-for-Profits Commission Regulation 2013.

Jane Hemstritch
President

Robert Wylie
Treasurer

Melbourne, 26 March 2020

Deloitte.

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26 March 2020

The Board of Directors
The Walter and Eliza Hall Institute of Medical Research
1G Royal Parade
PARKVILLE VIC 3052

Dear Board Members

The Walter and Eliza Hall Institute of Medical Research

In accordance with the Subdivision 60-C of the *Australian Charities and Not-for profits Commission Act 2012*, I am pleased to provide the following declaration of independence to the directors of The Walter and Eliza Hall Institute of Medical Research.

As lead audit partner for the audit of the financial statements of The Walter and Eliza Hall Institute of Medical Research for the year ended 31 December 2019, I declare that to the best of my knowledge and belief, there have been no contraventions of:

(i) the auditor independence requirements as set out in the *Australian Charities and Not-for profits Commission Act 2012* in relation to the audit; and

(ii) any applicable code of professional conduct in relation to the audit.

Yours sincerely

Deloitte Touche Tohmatsu

DELOITTE TOUCHE TOHMATSU

Anneke du Toit
Partner
Chartered Accountants

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Independent Auditor's Report to the Members of The Walter and Eliza Hall Institute of Medical Research

Opinion

We have audited the financial report of the Walter and Eliza Hall Institute of Medical Research ("WEHI"), which comprises the statement of financial position as at 31 December 2019, the statement of comprehensive income, statement of changes in equity and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies, and the declaration by the Directors.

In our opinion, the accompanying financial report presents fairly, in all material respects, the Entity's financial position as at 31 December 2019, and of its financial performance and its cash flows for the year then ended in accordance with Australian Accounting Standards and Division 60 of the *Australian Charities and Not-for-profits Commission Act 2012* (the ACNC Act).

Basis for Opinion

We conducted our audit in accordance with Australian Auditing Standards. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Report* section of our report. We are independent of the Entity in accordance with the auditor independence requirements of the ACNC Act and the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants* (the Code) that are relevant to our audit of the financial report in Australia. We have also fulfilled our other ethical responsibilities in accordance with the Code.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Information

The Directors are responsible for the other information. The other information obtained at the date of this auditor's report comprises Directors' Report, Statistical summary for the year ended 31 December 2019 and Capital Funds included in the annual report for the year ended 31 December 2019 but does not include the financial report and our auditor's report thereon.

Our opinion on the financial report does not cover the other information and we do not and will not express any form of assurance conclusion thereon.

In connection with our audit of the financial report, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial report or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work we have performed on the other information that we obtained prior to the date of this auditor's report, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Deloitte.

Those Charged with Governance's for the Financial Report

Those Charged with Governance are responsible for the preparation of the financial report that gives a true and fair view in accordance with Australian Accounting Standards – Reduced Disclosure Regime and the ACNC Act and for such internal control as Those Charged with Governance determine is necessary to enable the preparation and fair presentation of the financial report and is free from material misstatement, whether due to fraud or error.

In preparing the financial report, Those Charged with Governance are responsible for assessing the Entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless Those Charged with Governance either intend to liquidate the Entity or to cease operations, or have no realistic alternative but to do so.

Auditor's Responsibilities for the Audit of the Financial Report

Our objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of this financial report.

As part of an audit in accordance with the Australian Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Directors.

- Conclude on the appropriateness of the Directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Entity to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial report, including the disclosures, and whether the financial report represents the underlying transactions and events in a manner that achieves fair presentation.

Deloitte.

We communicate with Those Charged with Governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Deloitte Touche Tohmatsu

DELOITTE TOUCHE TOHMATSU

Anneke du Toit
Partner
Chartered Accountants
Melbourne, 26 March 2020

Statistical summary for the year ended 31 December 2019

	2019 $'000s	2018 $'000s	2017 $'000s	2016 $'000s	2015 $'000s
Operating revenue					
Australian Government	46,298	45,057	45,163	51,079	48,492
Victorian Government	10,513	10,909	12,739	7,753	7,419
Foreign governments	70	22	243	1	495
Government revenue	**56,881**	**55,988**	**58,145**	**58,833**	**56,406**
Industrial grants and contracts	8,689	7,182	4,044	3,227	4,691
Philanthropic grants and fellowships – Australia	13,399	15,759	7,444	8,804	8,062
Philanthropic grants and fellowships – international	3,343	6,824	6,468	5,805	7,386
Investment income	24,156	30,063	12,118	13,463	13,172
Royalty income	7,483	4,027	11,059	12,328	2,262
General revenue	8,916	8,260	7,560	5,746	4,430
Donations and bequests	10,373	13,568	9,327	8,816	7,297
Royalty monetisation revenue	35,633	-	331,082	-	-
Non-government revenue	**111,992**	**85,683**	**389,102**	**58,190**	**47,300**
Total revenue	**168,873**	**141,671**	**447,247**	**117,021**	**103,706**
Operating expenditure					
Staff costs	98,340	90,493	85,944	80,652	76,570
Laboratory operating costs	19,870	20,038	20,756	19,025	18,327
Laboratory equipment	3,565	3,352	4,047	3,610	2,284
Building operations	5,908	5,801	4,849	4,673	4,712
Administration	8,648	6,715	3,718	5,258	2,501
Fundraising	620	475	487	387	219
Business development	1,219	1,261	997	747	825
Allowance for credit loss increase / (decrease)	62	188	(47)	(115)	-
Royalty monetisation costs	10,104	4,755	51,143	-	-
Unrealised foreign exchange loss / (gain)	477	(4,998)	-	-	-
Total expenditure	**148,813**	**128,080**	**171,894**	**114,237**	**105,438**
Results from operating activities	**20,060**	**13,591**	**275,353**	**2,785**	**(1,732)**
Other income					
Profit or (loss) on sale of long-term assets	297	2	5,002	8,671	9,512
Fair value gain or (loss) on investments	5,261	(589)	-	-	-
Donations and bequests capitalised to Permanent Funds	1,359	6,510	2,877	5,162	719
Grants and donations for capital works	5,076	1,198	4,330	1,733	6,071
Total other income	**11,993**	**7,121**	**12,209**	**15,566**	**16,302**
Other expenses					
Loss on impairment write down of long-term investments	-	-	-	(709)	(4,808)
Depreciation and amortisation	(10,941)	(9,368)	(9,044)	(8,556)	(8,512)
Total other expenses	**(10,941)**	**(9,368)**	**(9,044)**	**(9,265)**	**(13,320)**
Net operating surplus	**21,112**	**11,344**	**278,518**	**9,086**	**1,250**
Capital funds					
Permanent invested capital funds	198,833	194,181	185,610	181,162	168,392
General funds	371,193	377,710	378,204	114,306	130,122
Royalty fund	55,039	48,054	44,410	34,981	26,169
Leadership fund	27,965	26,557	24,562	23,581	21,682
Discovery fund	5,271	4,961	4,545	2,682	2,362
Centenary fund	-	-	-	2,101	1,000
Investment revaluation reserve	67,200	8,211	40,853	34,393	35,305
Total funds	**725,501**	**659,674**	**678,184**	**393,206**	**385,032**
Capital expenditure					
Property, plant and equipment	12,252	22,029	16,078	9,960	5,062
Staff numbers: (equivalent full-time)					
Scientific research staff:					
– Senior faculty	87	80	78	78	79
– Postdoctoral scientists	213	199	183	188	176
– Visiting scientists	34	36	48	39	23
–Other laboratory research staff	235	241	241	252	238
Supporting staff:					
– Other support services	202	196	180	162	146
Total staff and visiting scientists	**771**	**752**	**730**	**719**	**662**
Students	**206**	**192**	**180**	**173**	**169**
Papers published	**388**	**417**	**419**	**429**	**410**

Capital Funds

Permanent Named Capital Funds

The following is a complete listing of all permanent funds held and invested by the Institute at 31 December, 2019.

*New donations of capital received in current financial period.

	2019 $
Adair John Bequest (ex DW)	399,172
Adair John Bequest (ex MF)	75,788
Alexander R Estate	159,164
Allison-Levick J & H	89,339
Alston Peter and Julie Florence Fellowship Fund	1,541,553
Amey AM Estate	38,435
Anderson KA Estate	285,697
Anderson NM Estate	17,313
Angus Dorothy Irene Estate	281,146
Anonymous	359,871
Anonymous	3,706,484
Anonymous – Tasmania	61,472
Anonymous – Victoria	7,403
Anonymous – Victoria	199,235
Arnel Florence Janet Maude Estate	58,142
Arter Myra G Estate	89,390
Ashford Ivy A Estate	35,386
Attwell Samuel E Estate	69,232
Atyeo George & Isobel Fund	50,858
Baker Alice Lillian Estate	84,274
Ballantyne JW Estate	805,907
Barfield WG Estate	54,707
*Barry Joan Elaine Memorial Fund	35,687
Bartlett Mary V Estate	38,767
*Bates Tim Memorial Diabetes Research Fund	195,665
Charles L Bartholomew Estate	160,861
Bauer Dr Franz Estate	66,212
Bell Valerie Amy	93,792
Benjamin EG Estate	62,048
Bennett LM Estate	39,243
Berry Ruby C Estate	165,573
Biderman Cyla Estate	79,026
Blain BE Estate	126,542
Bland RT Estate	380,551
Bock Lindsay William Estate	33,500
Boothman Alva Estate	777,775
Borrett M A Estate	604,508
Bran EG Estate	220,031
Brennan EM Estate	68,684
The Ruby Bryan Memorial Fund	750,410
Brittain W & VI Mem Fund	80,939
Brockhoff Nyon Trust	254,181
Brough AV Estate	87,438
Brown Isabelle A Estate	91,072
Bruce RH Estate	39,943
Buckland William Foundation Fund	234,324
Buckman Olive Estate	27,760
Bult C G Estate	506,129
Brumloop LAA Estate	87,182
Burley Stanley Estate	71,002
Burnet Sir Macfarlane Estate	144,000
Burns JC Estate	187,333
Cahill JL Estate	25,940
Callaway LJ Estate	49,671
Cambridge Beresford Estate	205,743
Carlin Freda Evelyn Estate	101,771
Carling DM Estate	181,818
Carlson Catherine Estate	91,285
Carlson Elizabeth F Estate	103,172
Carty LEW Charitable Fund	43,879
Cato EA Estate	900,223
Cato MC Estate	731,701
*Chapman Debbie Memorial Fund	17,325
Chatfield SL Estate	123,502
Claridge John PG Estate	36,811
Clark Lindesay Fund	998,918
Cockburn Clarice BP Estate	27,680
Cole DE Estate	793,552
Coles GO Estate	38,597
Collie Barbara Estate	153,680
Collie Betty Rae	215,490
Collie George Estate	2,411,392
Colliver Len Estate	56,801
Connolly Grace C Estate	130,798
Cormack Margaret Mary	97,578
Cory Joy & Desmond Cancer Research Fund	132,144
Coultass Hylda M Estate	131,117
Courtney Gwendoline Vera Estate	280,661
Coutts Dr ELA Estate	131,643
Coutts IBM Estate	27,915
*Craven DA Memorial Fund	1,286,095
JE Craven & MA Shearer Estates	49,883,236
Crawford Duncan Estate	17,168
Criswick R M Estate	523,555
Critchlow Ronald P Estate	306,358
Crowley MM Estate	214,074
Cubbins SG Estate	91,143
Cummings ED Estate	162,274
Cutter BE Estate	16,866
Darbyshire EJ (Ted) Estate	352,961
Davey Dorothy Estate	312,301
Davidson BI Estate	26,502
Davidson EE Estate	30,079
Davis FLG Estate	60,138
Dawson Anne Marie Estate	8,040
Del Cott RAM Estate	265,107
Deryk SD Estate	71,702
Sir Harold Dew and Family Estate	854,766
Dick MRK (Ray) Estate	222,472
Dickie Phoebe Estate	45,589
Dimsey WE Estate	229,443
Dobbie Myrtle M Estate	41,875
Dodgshun GM Estate	166,439
Dossetor Catherine L Estate	36,209
Dowie S Estate	23,507
Drakensberg Trust	2,527,317
*Drury Evelyn Ann Fund	223,603
Duncan PH Estate	99,342
East James Douglas Estate	189,084
Edwards Allen Richard Estate	198,867
Edwards HHW Estate	253,391
Eisner KR	97,851
Ellis GM Estate	3,841,911
Emery Harriet Anne Estate	21,812
Eva Michael Ross Estate	4,573,874
Facey Mary Bethune Estate	16,711
Fagg Maude V Estate	103,968
Fields Ernest Estate	292,281
Findlay Winifred Gertrude Estate	146,001
Fitzgerald Sheila Mary Estate	44,707
Ford Ada Joyce Estate	20,490
Fraser K Estate	2,117,663
Galbraith DA & DV Estate	115,460
Gerdts Sheila Lesley G Estate	69,329
Gibb Geo & Bennett Wm A	428,321
Gilbert Augusta Estate	387,039
Gilder CH Estate	17,068
Gillon AM Estate	3,228,236
Girdwood J Estate	254,397
Goldman Sachs JB Were Foundation	785,186
Gordon H & T Estate	113,972
Graves GC Estate	28,237
Gray Bessie Mavis Fund	26,823
Gray Clara Estate	77,041
Greig Harry Douglas Estate	538,189
Grubb Walter Joseph Estate	39,825
Guest Doris Rose Estate	16,751
Hackett Dorothy Estate	6,896
Hadfield RCS Estate	121,496
Hadley AN Estate	1,212,144
Hamilton M Estate	48,503

Harrap FM Estate	143,547
Harrap LM Estate	30,954
Harris John D & Lyla Foundation	910,635
Hartlett K Estate	1,046,477
Haydon Michael JM Memorial Fund	64,028
Hearse JD	1,273,305
Hemphill Olive May Estate	70,514
Henderson AN Estate	26,888
Henderson Joan Estate	137,425
Henry MA Estate	675,735
Heron Thelma Hope Estate	100,301
Highton GAN Estate	576,466
Hill Ramon Bruce Estate	162,314
Hind Ruby F Estate	35,015
Hocking Helen Estate	383,133
Holmes EM Estate	85,679
Hope Irene Estate	450,952
Hooper Nancy Hilda	119,076
Hosier MM Estate	160,743
Hurry M Estate	32,526
Inglis Dulcie M Estate	120,359
Ironside WH Estate	71,002
Jackson Catherine M Estate	205,035
Johnson Daphne Adele Estate	8,360
Johnson Ethel Grace Estate	48,623
Johnson Sydney Robert Estate	55,472
Johnstone Reginald Ben Estate	14,805
Judd Anita Estate	63,994
Kayler-Thomson Marion Estate	55,412
Keating L Estate	1,443,553
Keats LCA Estate	1,365,008
Kellock TH Estate	1,923,678
Kendall Nanyce Douglas	50,192
Kerr HM Estate	115,532
King DM Estate	44,051
Knight FF Estate	32,162
Lang John Murray Estate	790,662
*Lanigan Annie Maria (Nance) & Janet Mary Fund	42,838
Lanteri Gwen Estate	1,658,661
Larard DV Estate	13,672
Leckie Winifred Estate	229,493
Lilford VM Estate	506,099
Lins RD Estate	28,401
Little Mabel B Estate	69,280
Lyddon Pauline M Estate	1,273,806
Lyell Alexia Bequest	461,237
MacAskill WG & I	28,401
Mace Nina May Estate	307,104
MacDonald Elsie May Estate	191,610
Macindoe Jock & Diana Fund	42,601
MacIntosh Elizabeth H Estate	25,585
Mackie-Smith CM Estate	389,163
Macleay The Lillian & Kenneth Bequest	445,974
MacNamara Jean Fund	1,048
Mahoney Florence Cancer Fund	179,468
Malcolm Phyllis Elizabeth Estate	287,592
Maloney Kathleen Margaret Estate	23,670
Mann David Memorial Research Fund	49,189
Mansfield Trevor Geoffrey Estate	10,572
Marguccio R Estate	14,200
Mariner Barry Leonard Estate	65,614
McArthur Nellie M Estate	112,954
McCooke Miss MH Estate	356,732
McDonald Charles Thomas	19,359
McDougall Phyllis Mable Estate	134,227
McGhee ME Estate	77,322
McGregor Amy VK Estate	130,756
McGregor Elvira Ruth Estate	24,094
McGregor KB Estate	189,046
Mckay C N Fund	279,969
McKinnon Sheila May Estate	47,672
McLean Ada Myee Dutton Estate	562,320
McLennan B Estate	101,554
McNab M Estate	25,654
McNeill Sir James Fund	22,087
McRorie Ruby A Estate	83,046
Menagh Thelma Marie Estate	19,324
Miller Lorna May Estate	926,769
Miller MA Estate	66,465
Miller Violet Isabella Estate	77,346
Minney DW & NR Fund	14,200
Mitchell, Bettye Victoria Fund	4,660,140
Mitchell Doris Georgina Mildred	71,002
Mitchell G Fund	55,036
Moden FHW Estate	136,868
Moody E Vaughan Estate	1,356,604
Moon Ida Alice Estate	53,619
Mooney Carmel Mary, Estate of	178,465
Moore Phyllis Estate	14,200
Morgan DM Estate	418,759
Morris Foundation of Medical Research	179,486
Moss EE Estate	273,938
Muller FG Estate	20,275
Murray Alan Ambrose Estate	36,503
Murray Gwendoline Mary Fund	1,266,270
Must Mary Kathleen Bequest	1,109,759
Myer Dame Merlyn Estate	15,297
Myer Pam Sallmann Foundation	30,968
Nevill Melanie Joy	85,364
Newton Evelyn	19,843
Newton EM Estate	19,288
Nicholas Harold George Estate	338,635
*Norins Leslie Fund	314,630
Norton M Estate	898,363
Nossal Sir Gustav Fund	333,026
Nottingham SG Estate	36,727
Palmer DE Estate	27,718
Palmer Ethel Fund	333,760
Parker Barbara Memorial Fund	76,075
Parker Mabel V Estate	85,702
Parsons Kathleen FB Estate	43,389
Patten Ralph & Etty Bequest	322,809
Patterson Gerard A Estate	20,288
Paulin Leukaemia Fund	234,096
Paulin SC Estate	29,400
Payne Henry and Charlotte Fund	1,011,778
Peterson Vera Estate	606,460
Petley Francis Estate	161,103
Pierce John Lindsay Estate	1,293,824
Pietsch Dr CH Fund	215,887
Porter Florence JA Estate	138,727
Prater Mabel Edward	14,724
Pritchard DG Estate	36,448
Pyke MA Estate	17,040
Qualtrough Research Fund	2,884,842
Rae Olive Estate	1,185,809
Reeves Jessie Estate	66,585
Reid John T Charitable Trusts	8,574,578
Reiser Erwin Estate	28,401
Richardson DLK Estate	90,810
Ricker EM Fund	81,707
Roberts JI Charitable Fund	8,662
Robertson AT Estate	14,200
Rose Norma J Estate	14,355
Ruppel FE Estate	164,609
Salemann CW Estate	14,200
Sallmann L & E Memorial Fund	27,718
Santos TS Estate	919,641
Schack Elsie Edith Estate	134,380
Scott Annie May Estate	175,151
Sharp II Estate	22,323
Shaw Eileen Coryn Estate	24,866
Shelton Edgar Estate	871,612
Sidwell OB Estate	2,048,415
Skea Lyndal and Jean Leukaemia Fund	1,080,562
Skinner Phyllis Maye Estate	90,019
Smith Elsie Violet Estate	18,141
Smorgon Robert & Jack Family Foundation	399,738
Snow Freda Estate	64,582
Spence Frank Meldrum	36,811
Spencer Stanley L Estate	19,633
Stanbrough AE Estate	113,201
Stephens L Estate	117,787

Stevens SA Estate	134,176
Stevenson Dame Hilda Estate	96,088
Stewardson Family Trust	147,269
Stewart Jean Elma	90,474
Swingler Maxwell & Mary Bequests	2,717,633
Sydserff Charles SB Estate	17,864
Syme David Farnell Estate	1,037,767
Talbot P Estate	443,341
Taws M Estate	142,003
Taws GE Arthritis Fund	26,823
Taylor Sarah McQuillan Estate	66,095
Thomas JC Estate	326,899
Thompson O Estate	31,454
Thorpe Doris EB	96,971
Tink RM Estate	329,699
Tinkler VF Estate	63,670
Tomasetti John T Estate	451,269
Thompsom LW Estate	2,348,132
Tressider Edith Kathleen Estate	582,525
Trezise KW Estate	20,464
Tropical Diseases Fund	99,682
Turnbull JG Estate	83,465
Van Leeuwen GH Estate	504,504
Vincent-Smith IG Fund	203,621
Vogel Herta & FB Estate	14,355
Walker CM Estate	233,977
Walker Dorothy Hope Estate	2,500,664
Wallace Nancy Jeanie Estate	221,677
Walsh Dr William Butler Memorial Fund	914,950
Walter Ailsa Amy Mary Estate	173,174
Warnock EMC nee Riddle Estate	1,813,476
Watson MR Estate	16,251
Waxman Elizabeth H Estate	78,261
Wedge Erica Estate	358,955
Webb NJ Estate	288,248
Weeks Thelma Estate	14,724
Wekwerth Hilda Frances Estate	35,198
West John James Estate	108,882
Westcott Ita E Estate	22,860
White Morris G Estate	45,654
Wicks LR Estate	14,200
Williams AM Estate	94,052
Williams Irene E Estate	341,519
Wilson DE Estate	88,858
Wilson MML Estate	99,993
Wilson NF Estate	14,200
Wilson V M (Sunny) Estate	146,465
Wolstonecroft WW Estate	40,549
Wright Lynette Oreti Estate	205,712
Zillman Dudley V Estate	57,077

Fellowship and Scholarship Funds

Farrant Patricia & John Scholarship Fund	229,789
*Harris Alan Scholarship Fund	96,246
JHA Munro Foundation	1,106,176
*Macphee Avis Permanent Fund	59,343
Mathison G C Research Scholarship	217,092
*Metcalf Donald Scholarship Fund	1,157,596
Moffatt Edith Scholarship Fund	2,054,782
*The Sir Clive McPherson Family Centenary Fellowship	7,018,119

PhD Scholarship Funds

Carty EM Fund	458,038
Mackay Dr Ian Fund	363,974
Pearl Paddy Fund	1,605,820
Speedy Pauline Scholarship Fund	581,417
Syme Colin Fund	2,290,322
Wilson Ed Memorial Fund	2,030,142
The John and Margaret Winterbottom Bequest	749,267

Other Funds

Anonymous Seminar Award	18,236
Balderstone Award	48,219
Begley - Scientific Integrity and Ethics	77,829
Gideon Goldstein Fund	1,589,400
Speedy Pauline Innovation Grant Fund	727,202

The following Estates in which the Institute had an interest, were managed during the year by Trustees. (Income received by the Institute in the financial period is treated similarly to donations and bequests):

CH Boden Memorial Trust

John Frederick Bransden Memorial Fund

Thomas, Annie & Doris Burgess Charity Trust

Miss EM Drummond Estate

Frederick and Winifred Grassick Memorial Fund

Estate of Maxwell Gardiner Helpman

Estate of Shelia Mary Helpman

The Mackie Bequest

Irene and Ronald MacDonald Foundation

Albert H Maggs Charitable Trust

Mrs AM Reilly

Miss ML Reilly

The Stang Bequest

Emily Vera Winder Estate

Florence Mary Young Charitable Trust

Hazel and Pip Appel Fund

GT & L Potter Charitable Trust

Estate L J Baldy

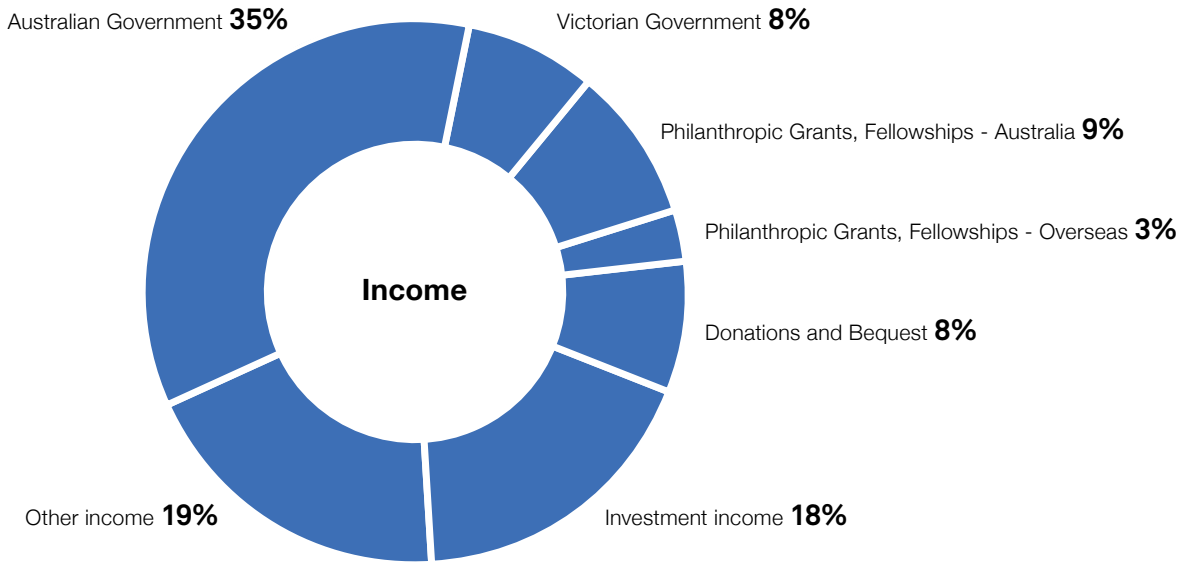
Leadership Fund

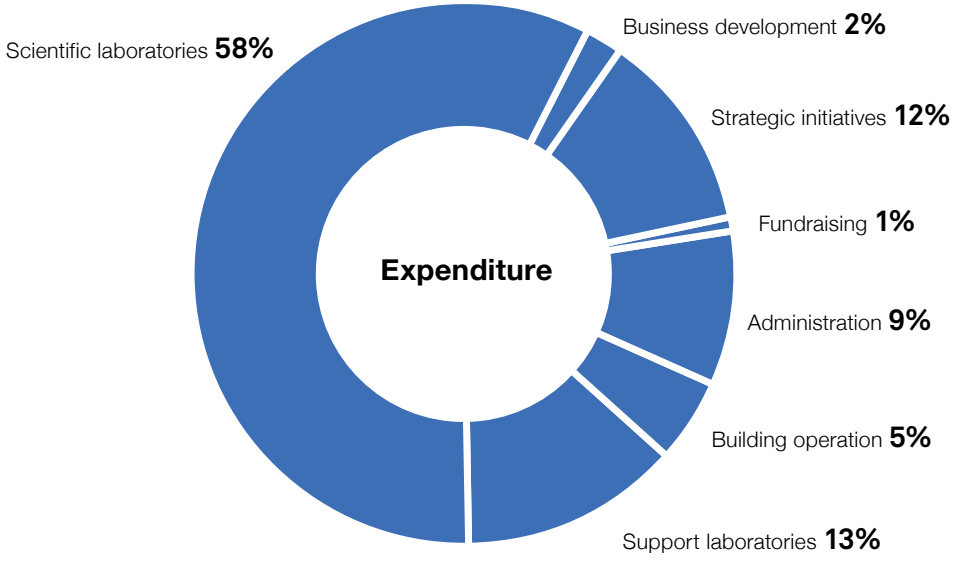
The Leadership Fund was established in honour of Professors Gustav Nossal, Donald Metcalf, Jacques Miller and Suzanne Cory to provide named Fellowships to nurture the development of outstanding young scientists with the potential to be future leaders of biomedical research. The Cory Fellowship is currently held by Misty Jenkins until 2021.

The Leadership Fund at 31 December 2019 included the following permanent funds ($10,000 and over):

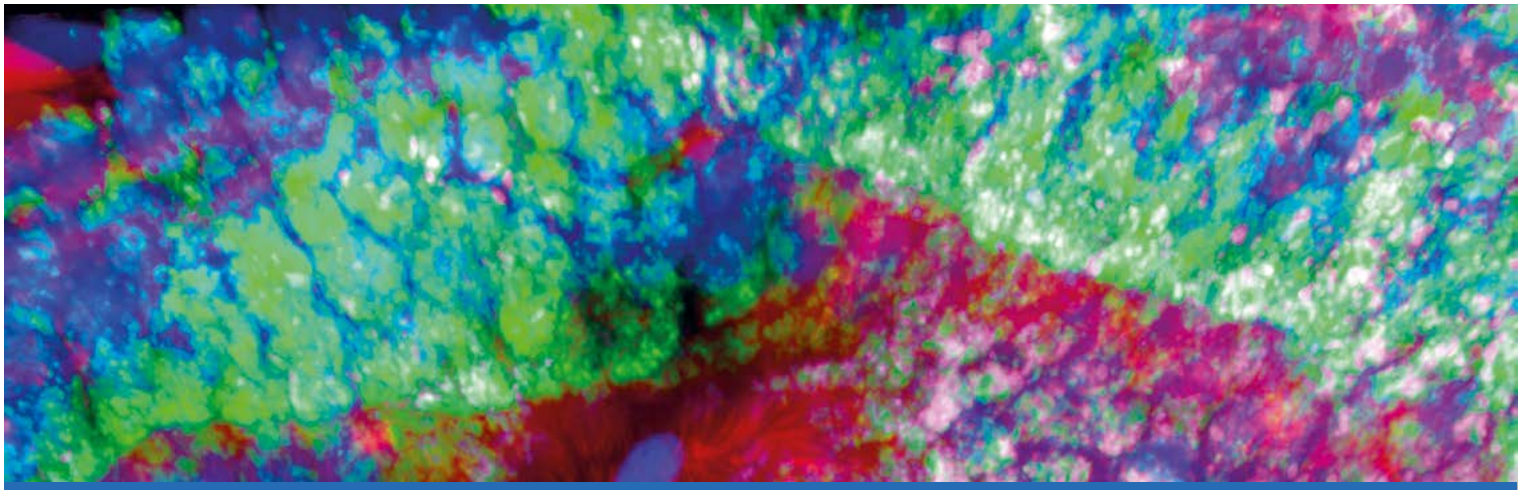
Sir Harold Dew and Family Estate	7,880,688
Chugai Pharmaceutical Co Ltd	1,640,342
The Ian Potter Foundation	1,640,342
L M Archibald Estate	1,093,562
Albert H Maggs Charitable Trust	1,069,673
Helen Macpherson Smith Trust	656,136
Anonymous	546,780
Anonymous	546,780
E Vaughan Moody Estate	546,780
The Broken Hill Proprietary Company Limited	546,780
J B Were & Son Charitable Fund	546,780
Eunice L Lambert Estate	537,874
Betty Eunice Stephens Estate	368,255
National Australia Bank	328,069
Victor Smorgon Charitable Fund	240,583
The Sidney Myer Fund	196,842
Leslie D W Stewart Estate	160,933
Joe White Bequest	148,725
Krongold Foundation Pty Limited	109,356
Professor Sir Gustav Nossal	109,356
The Scobie and Claire MacKinnon Trust	109,356
The R & J Law-Smith Gift	65,614
National Mutual Holdings Limited	65,614
Pacific Dunlop Ltd	65,614
Sheila R White Estate	64,695
Coles Myer Ltd	54,677
James Kirby Foundation	54,677
Arthur Andersen & Co Foundation	43,741
Arthur Robinson & Hedderwicks	43,741
H B Kay Estate	21,872
Stephelle Pty Ltd	21,872
C M Walter	21,872

The period at a glance (net monetisation)





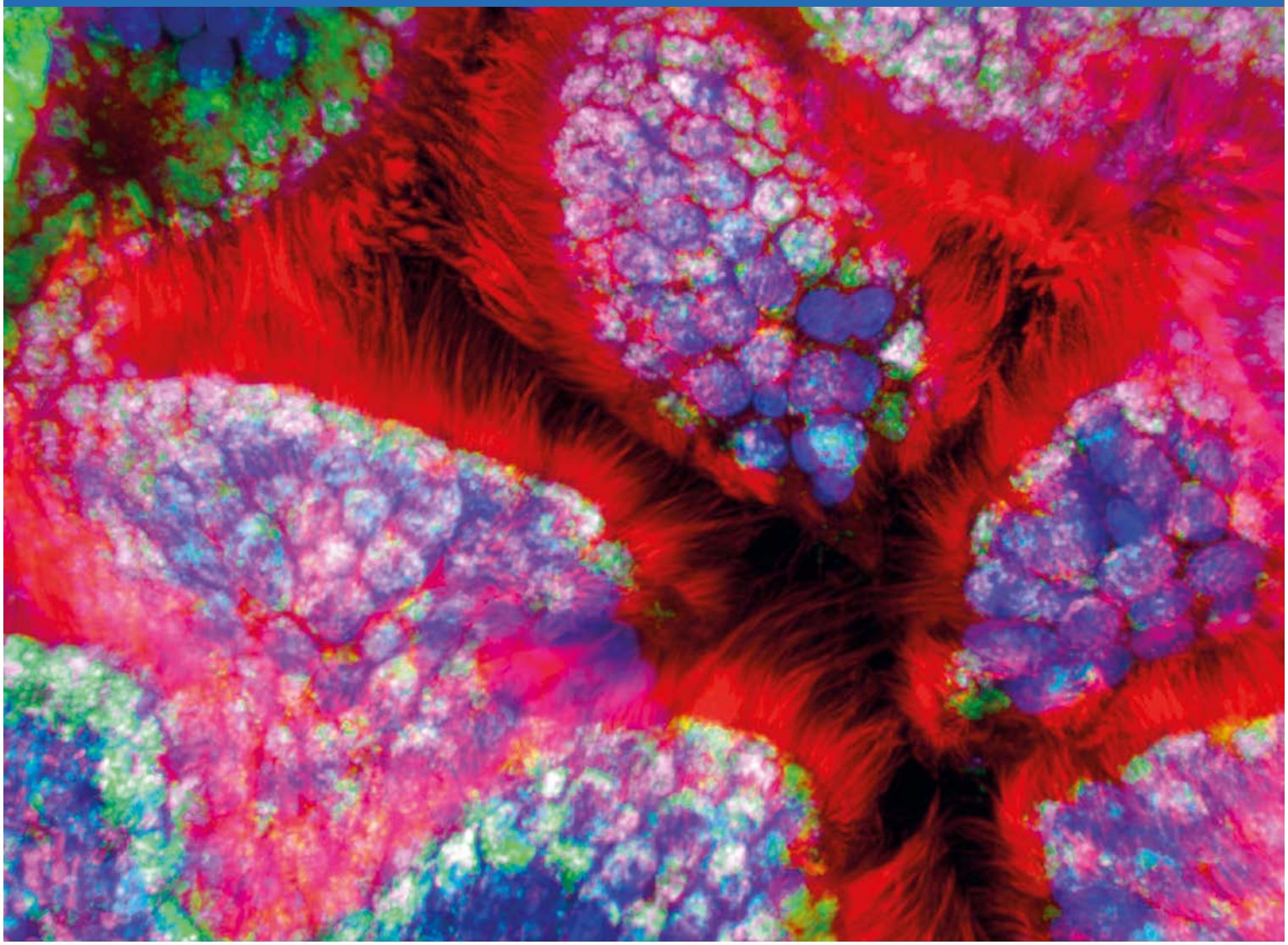
The Year In Brief	2019 $'000	2018 $'000
Income for operations	**168,873**	**141,671**
Expenditure in operations	**148,813**	**128,080**
Net surplus (deficit) from operations	**20,060**	**13,591**
Number of staff and visiting scientists	**771**	**752**
Number of postgraduate students	**206**	**192**
Total staff and students (EFT)s	**977**	**944**



Walter+Eliza Hall
Institute of Medical Research

DISCOVERIES FOR HUMANITY

ANNUAL REPORT 2019 PUBLICATIONS



Publications

ATB Advanced Technology and Biology division
BIO Bioinformatics division
BCBC Blood Cells and Blood Cancer division
CBSC ACRF Cancer Biology and Stem Cells division
CBD ACRF Chemical Biology division
EDD Epigenetics and Development division
IMM Immunology division
IDID Infectious Diseases and Immune Defence division
INFL Inflammation division
PONC Personalised Oncology division
PHI Population Health and Immunity division
SBD Structural Biology division
USD Ubiquitin Signalling division

Number of Publications

Primary: 308
Review: 77
Book Chapter: 3
Total: 388

Primary

1. Abayakoon P, Epa R, Petricevic M, Bengt C, Mui JW, van der Peet PL, Zhang Y, Lingford JP, White JM, Goddard-Borger ED, Williams SJ. Comprehensive synthesis of substrates, Iintermediates, and products of the sulfoglycolytic Embden-Meyerhoff-Parnas pathway. *J Org Chem* 84:2901-2910, 2019 CBD

2. AbuHammad S, Cullinane C, Martin C, Bacolas Z, Ward T, Chen H, Slater A, Ardley K, Kirby L, Chan KT, Brajanovski N, Smith LK, Rao AD, Lelliott EJ, Kleinschmidt M, Vergara IA, Papenfuss AT, Lau P, Ghosh P, Haupt S, Haupt Y, Sanij E, Poortinga G, Pearson RB, Falk H, Curtis DJ, Stupple P, Devlin M, Street I, Davies MA, McArthur GA, Sheppard KE. Regulation of PRMT5-MDM4 axis is critical in the response to CDK4/6 inhibitors in melanoma. *Proc Natl Acad Sci U S A* 116:17990-18000, 2019 BIO PONC

3. Agarwal R, Chan YC, Tam CS, Hunter T, Vassiliadis D, Teh CE, Thijssen R, Yeh P, Wong SQ, Ftouni S, Lam EYN, Anderson MA, Pott C, Gilan O, Bell CC, Knezevic K, Blombery P, Rayeroux K, Zordan A, Li J, Huang DCS, Wall M, Seymour JF, Gray DHD, Roberts AW, Dawson MA, Dawson SJ. Dynamic molecular monitoring reveals that SWI-SNF mutations mediate resistance to ibrutinib plus venetoclax in mantle cell lymphoma. *Nat Med* 25:119-129, 2019 IMM BCBC

4. Ahler E, Register AC, Chakraborty S, Fang L, Dieter EM, Sitko KA, Vidadala RSR, Trevillian BM, Golkowski M, Gelman H, Stephany JJ, Rubin AF, Merritt EA, Fowler DM, Maly DJ. A combined approach reveals a regulatory mechanism coupling Src's kinase activity, localization, and phosphotransferase-independent functions. *Mol Cell* 72:393-408.e320, 2019 BIO

5. Amor DJ, Stephenson SEM, Mustapha M, Mensah MA, Ockeloen CW, Lee WS, Tankard RM, Phelan DG, Shinawi M, de Brouwer APM, Pfundt R, Dowling C, Toler TL, Sutton VR, Agolini E, Rinelli M, Capolino R, Martinelli D, Zampino G, Dumic M, Reardon W, Shaw-Smith C, Leventer RJ, Delatycki MB, Kleefstra T, Mundlos S, Mortier G, Bahlo M, Allen NJ, Lockhart PJ. Pathogenic variants in GPC4 cause Keipert Syndrome. *Am J Hum Genet* 104:914-924, 2019 PHI

6. Ang CH, Hsu SH, Guo F, Tan CT, Yu VC, Visvader JE, Chow PKH, Fu NY. Lgr5(+) pericentral hepatocytes are self-maintained in normal liver regeneration and susceptible to hepatocarcinogenesis. *Proc Natl Acad Sci U S A* 116:19530-19540, 2019 CBSC

7. Annunziato S, de Ruiter JR, Henneman L, Brambillasca CS, Lutz C, Vaillant F, Ferrante F, Drenth AP, van der Burg E, Siteur B, van Gerwen B, de Bruijn R, van Miltenburg MH, Huijbers IJ, van de Ven M, Visvader JE, Lindeman GJ, Wessels LFA, Jonkers J. Comparative oncogenomics identifies combinations of driver genes and drug targets in BRCA1-mutated breast cancer. *Nat Commun* 10:397, 2019 CBSC

8. Ansell BRE, Pope BJ, Georgeson P, Emery-Corbin SJ, Jex AR. Annotation of the *Giardia* proteome through structure-based homology and machine learning. *Gigascience* 8:giy150 2019 PHI

9. Armitage AE, Agbla SC, Betts M, Sise EA, Jallow MW, Sambou E, Darboe B, Worwui A, Weinstock GM, Antonio M, Pasricha SR, Prentice AM, Drakesmith H, Darboe MK, Kwambana-Adams BA. Rapid growth is a dominant predictor of hepcidin suppression and declining ferritin in Gambian infants. *Haematologica* 104:1542-1553, 2019 PHI

10. Azimi I, Milevskiy MJG, Chalmers SB, Yapa K, Robitaille M, Henry C, Baillie GJ, Thompson EW, Roberts-Thomson SJ, Monteith GR. ORAI1 and ORAI3 in breast cancer molecular subtypes and the identification of ORAI3 as a hypoxia sensitive gene and a regulator of hypoxia responses. *Cancers* 11:pii: E208, 2019 CBSC

11. Babon JJ, Stockwell D, DiRago L, Zhang JG, Laktyushin A, Villadangos J, Ching A, Ishido S, Hilton DJ, Alexander WS, Nicola NA. Membrane-Associated RING-CH (MARCH) proteins down-regulate cell surface expression of the interleukin-6 receptor alpha chain (IL6Ra). *Biochem J* 476:2869-2882, 2019 SBD BCBC USD

12. Bachem A, Makhlouf C, Binger KJ, de Souza DP, Tull D, Hochheiser K, Whitney PG, Fernandez-Ruiz D, Dahling S, Kastenmuller W, Jonsson J, Gressier E, Lew AM, Perdomo C, Kupz A, Figgett W, Mackay F, Oleshansky M, Russ BE, Parish IA, Kallies A, McConville MJ, Turner SJ, Gebhardt T, Bedoui S. Microbiota-derived short-chain fatty acids promote the memory potential of antigen-activated CD8(+) T cells. *Immunity* 51:285-297, 2019 IMM

13. Bah A, Muhammad AK, Wegmuller R, Verhoef H, Goheen MM, Sanyang S, Danso E, Sise EA, Pasricha SR, Armitage AE, Drakesmith H, Cross JH, Moore SE, Cerami C, Prentice AM. Hepcidin-guided screen-and-treat interventions against iron-deficiency anaemia in pregnancy: a randomised controlled trial in The Gambia. *Lancet Glob Health* 7:e1564-e1574, 2019 PHI

14. Bancroft EK, Saya S, Page EC, Myhill K, Thomas S, Pope J, Chamberlain A, Hart R, Glover W, Cook J, Rosario DJ, Helfand BT, Hutten Selkirk C, Davidson R, Longmuir M, Eccles DM, Gadea N, Brewer C, Barwell J, Salinas M, Greenhalgh L, Tischkowitz M, Henderson A, Evans DG, Buys SS, Impact Study Steering Committee, Impact Collaborators, Eeles RA, Aaronson NK, includes Lindeman GF. Psychosocial impact of undergoing prostate cancer screening for men with *BRCA1* or *BRCA2* mutations. *BJU Int* 123:284-292, 2019 CBSC

15. Bedo J. BioShake: a Haskell EDSL for bioinformatics workflows. *PeerJ* 7:e7223, 2019 BIO

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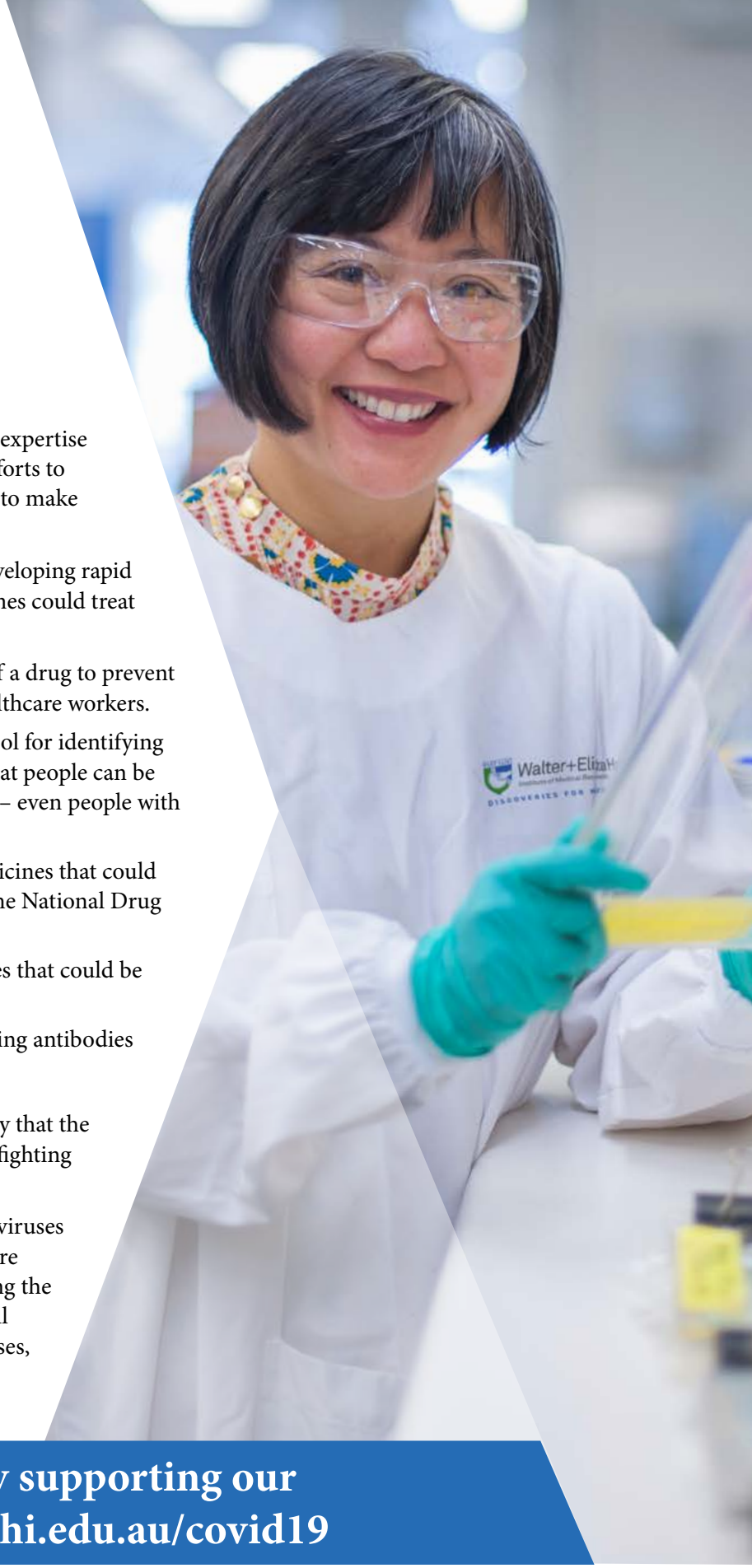
DISCOVERIES FOR HUMANITY

Together, we can fight COVID-19



At the Walter and Eliza Hall Institute, we are mobilising our researchers and applying our expertise to help support national and international efforts to tackle this pandemic. It's part of our mission to make discoveries that help humanity.

The Institute's researchers are working on developing rapid diagnostic tests and discovering how medicines could treat or prevent COVID-19, including:

- COVID SHIELD – the clinical trial of a drug to prevent COVID-19 in high-risk frontline healthcare workers.
- Developing a new, rapid diagnostic tool for identifying COVID-19 and other infections so that people can be diagnosed within minutes, not hours – even people with no symptoms.
- Fast-tracking discoveries of new medicines that could help to fight coronaviruses through the National Drug Discovery Centre.
- Assessing potential antiviral medicines that could be effective in tackling coronaviruses.
- Developing 'biologics' medicines – using antibodies to fight coronavirus infections.

It's thanks to the generosity of the community that the Institute has been able to direct resources to fighting COVID-19.

Together, we can fight COVID-19 and other viruses that threaten our community, to better prepare ourselves for the future. Thank you for helping the brilliant scientists at the Walter and Eliza Hall Institute in their quest to combat coronaviruses, including COVID-19.

You can join the fight by supporting our COVID-19 research: wehi.edu.au/covid19

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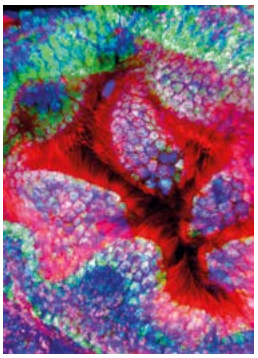


Cover image

A brush with power
Dr Stephen Mieruszynski

2018 *Art of Science*

This kaleidoscope of colour is a cross-section of a fish intestine that, in reality, is no bigger than the width of a human hair.

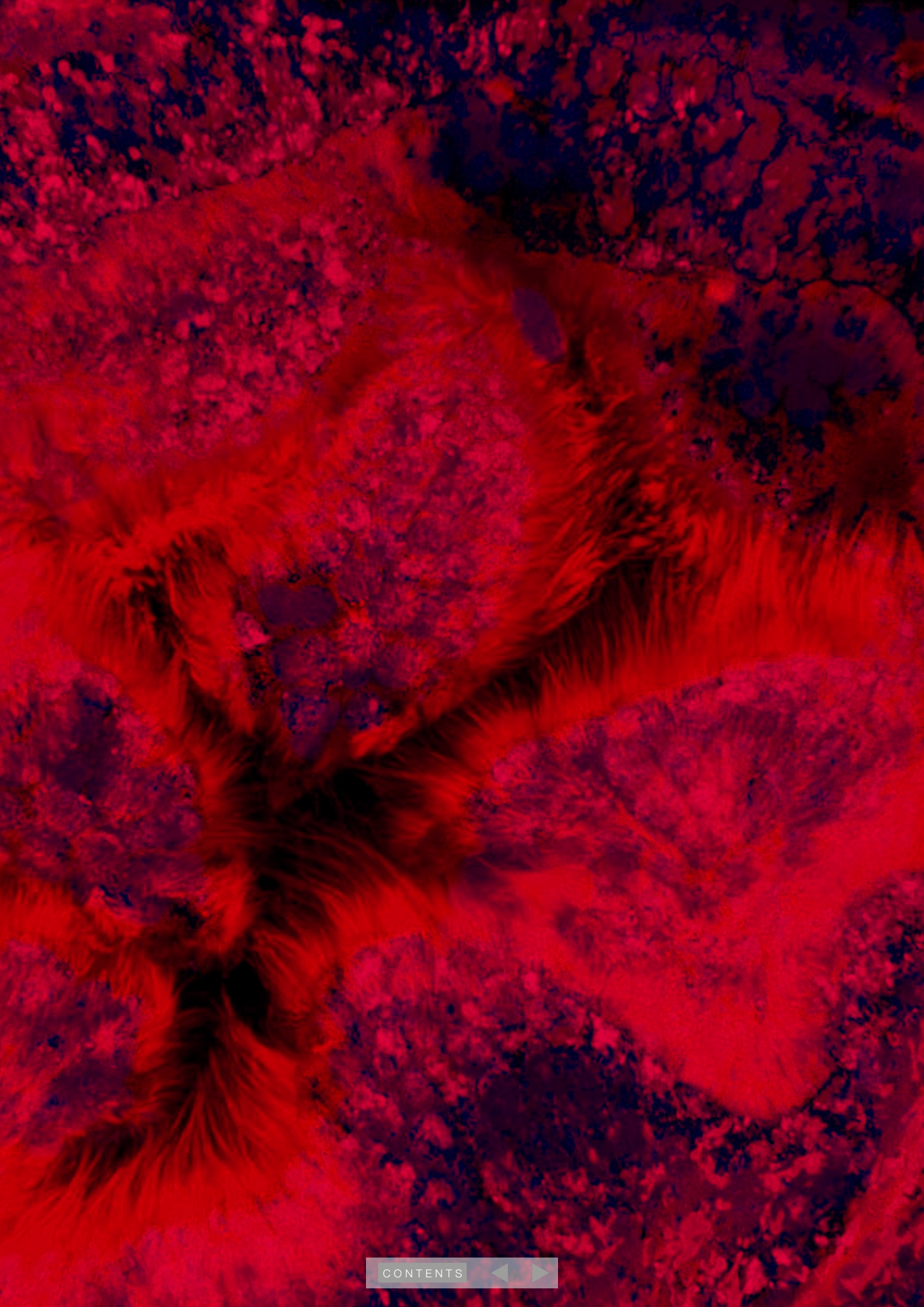
Using a state-of-the-art microscope, Dr Stephen Mieruszynski has captured this image with astonishing detail, right down to the cellular level. The white splotches and 'furry' red areas are markers of good intestinal health.

Mitochondria – the 'powerhouse' of the cell – can be seen in green. The key function of mitochondria is to convert nutrients into energy and, for this reason, they can also play a role in fuelling cancer growth.

Dr Mieruszynski is interested in the conflicting role mitochondria play in maintaining energy and helping cancer cells to survive. He wants to disrupt the function of mitochondria just enough to starve cancer cells, but not so much as to compromise their ability to maintain cellular health.

Understanding how mitochondrial processes are hijacked by cancer cells could help to develop a drug that stops certain cancers from growing without affecting a patient's well-being.

All photos used in this annual report that include two persons or more were taken prior to social distancing guidelines being implemented at the Institute and in Australia.



Together, we can fight COVID-19

Working in collaboration with the global medical research community is key to overcoming COVID-19.

At the Walter and Eliza Hall Institute, we are mobilising our researchers and applying our expertise to help support national and international efforts to tackle this pandemic.

It's thanks to the generosity of the community that the Institute has been able to direct resources to fight COVID-19.

Together, we can fight COVID-19 and other diseases that threaten our community, to better prepare ourselves for the future. Thank you for helping the brilliant scientists at the Walter and Eliza Hall Institute in their quest to combat diseases, including COVID-19.

Your donation will directly support vital medical research. Donations of $2 or more are tax deductible in Australia.

(L-R) Professor Marc Pellegrini and Dr Simon Preston

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