Otago Medical Research FOUNDATION

2018 Annual Report

CONTENTS

Charities Number: CC33444

OMRF.ORG.NZ

OBJECT OF THE FOUNDATION

There is not one person alive today who has not benefitted from medical research.

The Object of the Otago Medical Research Foundation: the furtherance of medical research in Otago.

We fund world class research, equipment and facilities for Otago's highly talented medical community of scientists, students, practitioners and lecturers.

Our recipients contribute invaluable medical knowledge that can be applied to medicine and prevention in the future, and in doing so we also retain top medical talent and intellectual property in Otago.

MEDICAL RESEARCH IS A LIFE CHANGER.

YOU'RE A LIFE CHANGER.

The answers unearthed through medical research irrefutably lead to greater quality of life for society – through earlier diagnosis and treatment. Since the Foundation was established in 1967, it has identified and funded more than $8.5 million worth of grants and scholarships, with much of the work undertaken now acclaimed around the world.

The lives of tens of millions of people have ultimately been improved by the research funded by the Otago Medical Research Foundation, made possible by you, our generous supporters.

IT ALL STARTS SOMEWHERE.

The Foundation helps to fund medical research projects and scholarships which are highly novel and scientifically worthy, but due to their early exploratory nature don't attract the interest of larger funding agencies.

However, in the world of medical research what the Foundation launches cannot be underestimated. Once that initial research has been completed and the answers reported, it often opens up new areas of investigation for bigger entities to develop.

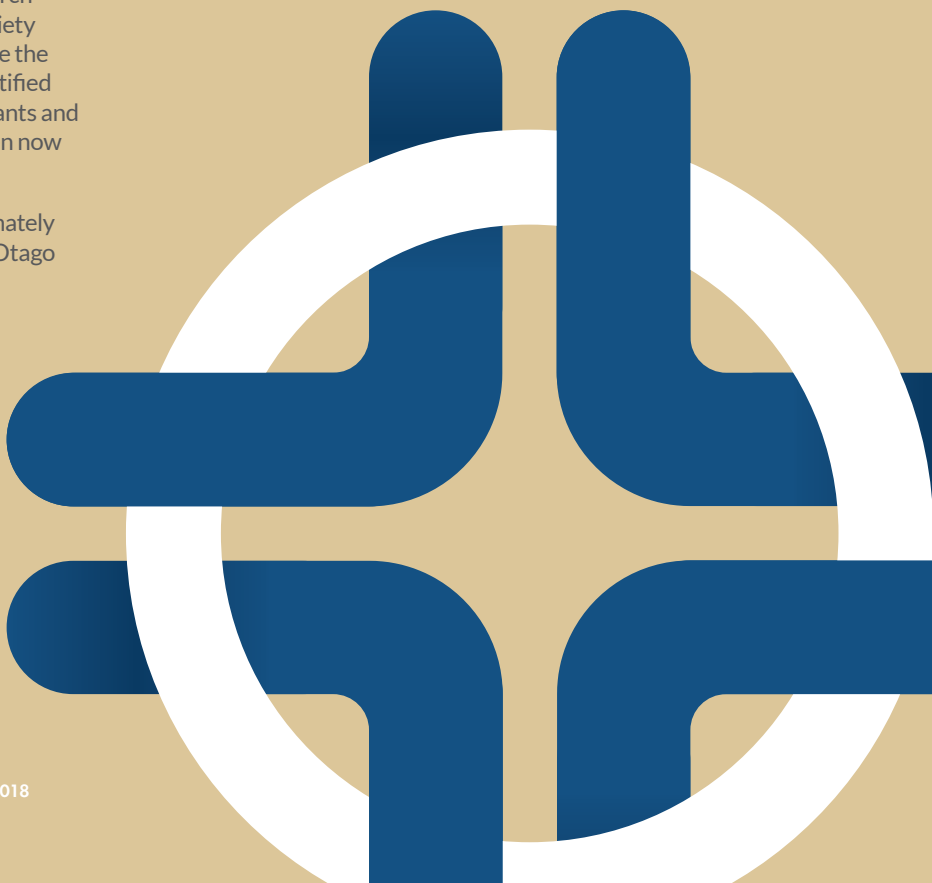
So the research never stops and many of our esteemed alumni are now global leaders in their medical fields.

EVERYONE BENEFITS FROM MEDICAL RESEARCH.

There is not one person who has not benefitted from answers found through medical research.

Whether that be personally, through parents or children, partners or siblings, work mates or their friends. We will all know many who wouldn't be with us had it not been for the discoveries made and the earlier diagnosis and less invasive treatment that research unveils.

It is irrefutable that from medical research we all benefit.



CHAIRPERSON'S REPORT

2018 GRANTS TOTALLED
$361,271

2018 BEQUESTS
$152,979

TOTAL AMOUNT FUNDED*
$8,897,968
*Since the Foundation's inception

It is with pleasure that I present the 50th Annual Report on the Otago Medical Research Foundation's activities for the 2018 financial year.

During the year under review, the Foundation approved Grants totalling $361,271 a decrease of $114,253 on last year's total of $475,524. Since the Foundation's inception, a total of $8,897,968 has been spent on Medical Research in Otago.

Before commenting on other matters I would mention with sadness, the sudden passing in December of one of the Foundation's most loyal supporters: Karen Bardwell. Karen's contribution to the Foundation is mentioned in a tribute on page 8.

The extract from the Financial Statements, as published elsewhere in the Annual Report, shows a surplus for the year of $159,202 compared with a deficit for the previous year of $10,703 meaning that the result is $169,905 better than last year. Two contributing factors to this result are a Legacy received of $152,979 and Research Grants being $114,523 less than last year. Part of the decrease in Research Grants can be attributed to $23,899 of Grants previously recorded as approved, being cancelled. It would be good to see an increase in the receipt of further injections of capital for investment, which would to help counter the reduced investment rates that we earn on our conservatively invested funds.

The Investment Sub-Committee has continued to face the challenge of finding suitable low risk investments while acknowledging that income and growth are also important. Fixed interest markets continue to remain challenging with subdued yields on offer in the secondary market and a supply /demand imbalance between new bond issues and maturing securities. It is pleasing to report that at balance date, the market value of our Company Securities and Shares shows an unrealised gain on cost of $835,068, which is 18.73 % of cost.

At 31 March, 2018, Accumulated General Funds total $422,780 and Accumulated Special Funds $4,676,407, a total of $5,099,187, both these figures comprising Capital and Income.

This year marked the 21st year in which the Otago Community Trust has awarded an Annual Grant to the Foundation with the details of grants awarded from this year's funding being published in the

Scientific Committee Report. This brings the total grants received from the Otago Community Trust to $1,491,000 a truly generous contribution. On behalf of all members of the Foundation and all Researchers based in Dunedin I would like to sincerely thank the Otago Community Trust for their very generous, and much needed, contributions.

The Foundation is deeply indebted to those people who have named the Foundation as a beneficiary in their wills. Medical research is a never ending activity and the role of the Foundation will continue as long as there are medical scientists willing to ask critical questions and people willing to help fund these researchers in their quest for the vital answers. I would ask members to consider the Foundation when preparing their wills. A bequest to the Foundation will be effectively used and your influence will be felt beyond your lifetime.

ASSOCIATE PROFESSOR PAT CRAGG

On Tuesday, 6th March, 2018, due to her impending retirement from the University on 31st May, 2018, Pat Cragg attended her last Council Meeting, thus signalling an end to her association with the Otago Medical Research Foundation dating back to 1988. Pat joined the Foundation both as a Councillor and as a member of the Scientific Committee, of which she became Chair 3 years later, and continued in that role until her final Council meeting.

In view of that outstanding contribution, Council unanimously agreed to the appointment of Pat as an Honorary Life Member of the Foundation at her last Council Meeting and presented Pat with a Certificate of Life Membership and an appropriate farewell gift.

In supporting the awarding of a Life Membership to Pat, one Council member noted that "the amount of work Pat undertakes on the Foundation's behalf is quite staggering" and this truly summed up Pat's contribution.

On behalf of everyone associated with the Foundation I wish Pat and Steve a very long and enjoyable retirement.

Professor Greg Jones, who has been on the Scientific Committee for 16 years, and been Deputy Chair since 2014, has been appointed Chair of the Scientific Committee to replace Pat.

COUNCIL MEMBERSHIP

There have been 2 resignations from Council Members since the last AGM, Assoc Prof Pat Cragg, an Ex – Officio member and Prof John Highton, an Appointed Member. Pat's contribution to the Foundation has been mentioned previously in this report and I thank John most sincerely for his contribution over many years.

At the Annual General Meeting, held on 12th September, 2017, Judy Bevin and Michael Mine who had been Co- opted members of Council were declared elected as Elected Members of Council as was Sharon Knowles. Sharon is a Partner in Anderson Lloyd, Lawyers and brings her legal expertise to Council.

CHANGE OF RULES

Those attending the Annual General Meeting will be asked to vote in support of changing some of the rules which were last revised in December, 2012.

The main changes relate to Clause 7, Scientific Committee and have been suggested by Pat Cragg to:

1. Reflect name changes within the University
2. Allow for the Deputy Chairperson of the Scientific Committee to be a Council Member as of right rather than a Co-opted Member as at present and to put a structure in place regarding the appointment and length of term for the Deputy Chairperson.

Changes have also been made to reflect changes in technology, to fine tune some administration matters and to clarify the position and rights of Employees and Contractors attending meetings of Council.

There has been no change to the object of the Foundation which remains as "The furtherance of medical research in Otago" and there will be no real change in the way it will continue to operate under the proposed changes.

The proposed changes have been approved by Council to go to the AGM for Members approval.

THANKS

Firstly, to all those Trusts, Companies, Individuals, Members and Non –Members listed in this Annual Report who have supported the Foundation in the year under review. The Foundation is very grateful that it has continued to receive the support that it has in these continuing difficult economic times.

To the Foundation's Director of Development, Susan Sims and our Events Manager, Steve Davie, my sincere thanks for your efforts during the year. As Susan will agree it has been a steep learning curve for her in her first year in the role. We were indeed fortunate that Steve agreed to stay with the Foundation in the role of Events Manager, thus enabling Susan to get to grips with her new role while knowing that the main fundraising events would continue on as previously under Steve.

Susan's report can be found on page 10.

To the Scientific Committee and their longstanding and dedicated Chairperson, Associate Professor Pat Cragg for the many long hours spent on the assessment and advice on grant applications to ensure a transparent and robust process which ensures the Foundations funds are used in the best possible way.

With the retirement of Pat Cragg, as mentioned previously, we welcome Professor Greg Jones and look forward to him continuing in this role for some time.

Thank you; your efforts are really appreciated. Without you all we would not be able to achieve the object of the Foundation, "The Furtherance of Medical Research in Otago".

To all Council Members, and our Patron, Emeritus Professor Gil Barbezat, for your contribution and support, my sincere thanks for your continued interest in, and work done, for the Foundation.

To my fellow Investment Sub-Committee members, Mike Horne, Michael Milne and Judy Bevin for their wise counsel, advice and time so willingly given to serve on this Sub-Committee, I thank you most sincerely.

To the Deloitte team of Mike Horne, Megan Vintiner, Trudy Corbett and Josh Cuming for continuing to provide very professional, friendly and efficient administration services for the Foundation. Mike and Megan are the face of Deloitte for the Council while Trudy and Josh are the backroom team, ensuring that the Foundations day to day requirements are attended to in a timely and professional manner and your efforts are very much appreciated.

Since the Council meeting on 6th March, Megan has taken up a position at the Otago Polytech and while her efficiency and pleasant manner will be missed, on behalf of Council, I wish her all the best for the future. Josh Cuming has moved out of the backroom team and will take over the work so ably performed by Megan and with his background on Foundation matters I am sure that the changeover will be seamless.

This report signals the end of the 1st 50 years of the Foundation and we look forward to our 2nd 50 years and a continuation of our activities relating to "The furtherance of medical research in Otago".

On behalf of the Council,

Ken Dempster
Chairperson

FUNDS GIVEN

Of scholarships, grants, trust grants, Laurenson grants and Jack Thomson grants

SUMMER SCHOLARSHIPS


Heart **$13,000**


Neuro/Brain **$12,000**


Oral Health **$8,000**


Drug Development **$4,000**


Immunity/ Microbiology **$4,000**


Community Health **$12,000**


Bacteria Resistance **$5,000**


Cancer **$8,000**


Cells **$8,000**

ANNUAL GRANTS


Cells **$15,000**


Neuro/Brain **$57,920**


Bacteria Resistance **$34,219**

LAURENSON


Gut Health **$30,000**


Pregnancy **$25,000**


Drug Development **$25,000**

OTAGO COMMUNITY TRUST


Osteoporosis **$6,000**


Neuro/Brain **$26,428**


Immune System **$20,000**


Drug Development **$12,000**

JACK THOMSON


Joint pain **$23,699**


Osteoarthritis **$20,153**


Rheumatoid Arthritis **$35,000**

RESEARCHER PROFILE: ASSOCIATE PROFESSOR RAJESH KATARE

Around 465 million people in the world suffer from diabetes – it is a growing health problem.

The Otago Medical Research Foundation is playing its part in looking at ways to combat this global health crisis, through financial support to the University of Otago.

Associate Professor Rajesh Katare from the University's Department of Physiology has had an OMRF grant, with support from the Zonta Club of Metropolitan Dunedin, to investigate diabetes and its role in chronic heart failure. His research has the potential to help prevent or delay heart disease, and ultimately save lives.

The research had three components:

- Identify the mechanisms through which diabetes can damage the heart
- Search for easily detectable biomarkers that circulate in the blood so that diabetes-induced damage to the heart can be detected early, before there are clinical signs. One of Associate Professor Katare's projects is working with paediatricians and children with type one diabetes to see if heart disease risk can be detected very early
- Develop personalised therapies based on commercially available biomarker tests that help primary health providers work with patients to prevent heart problems. Such therapies can make changes to suit lifestyle, or pre-clinical manipulations can be introduced that will delay or prevent heart disease. Currently cardiac stem cells treatment is being investigated as a promising treatment

"We're lucky to have good long-term data – some of our samples collected from 11 years ago presents very good opportunities to look at any changes in heart health and corresponding changes in biomarkers in the blood," he said.

"The good thing about Dunedin research is that it is very collaborative, which is the envy of some of our overseas colleagues; we conduct our investigations alongside clinicians and people in the community with diabetes."

"We are now publishing papers on our research in prestigious journals because of the Foundation's funding, which then means we can develop bigger projects at a higher level; we're now fortunate to attract funding from a variety of sources."

"The good thing about Dunedin research is that it is very collaborative, which is the envy of some of our overseas colleagues; we conduct our investigations alongside clinicians and people in the community with diabetes"

ASSOCIATE PROFESSOR RAJESH KATERE

MEET SOME OF THE SUPPORTERS BEHIND THE FOUNDATION

KAREN BARDWELL AND SELECT RECRUITMENT

Select Recruitment is continuing the legacy of one of the OMRF's most loyal supporters.

Foundation patron Karen Bardwell, who sadly passed away in December 2017, was Managing Director of recruitment companies Select Recruitment and Oyster Executive Recruitment, and responsible for Oyster's sponsorship of the annual Night to Remember fundraising dinner.

Supporting the Foundation was important to Karen, not only for the far-reaching studies it underpinned and the difference that research made, but also because it was a very positive way of supporting talent and helping young people to establish their careers.

Select Commercial Business Manager Dean Delaney has confirmed Select's continued support as principal sponsor for the Night to Remember event in 2018, and as an associate sponsor for Club Otago.

As Dean pointed out, anyone who knew Karen knew she was passionate about the city and economic development and was proud to be part of something that was making such a difference. "Karen thought sponsoring the Foundation was a fantastic way to support Dunedin, and we agree – we wanted to see it continued."

"We can see that supporting the fundamental 'ripper rugby' of start-up research can kickstart brand new areas of understanding the human condition and is very important to those beginning their careers in science - everyone benefits. Karen's family and the team at Select all felt the need to re-commit to be a strategic sponsor – it's an arrangement that provides value for both to our business and for the Foundation's good work."

"Giving back is an important part of being in business, and we are pleased to tell our clients we are sponsoring the Foundation to play our part in the community we live and work in. It's something all businesses should be doing."

Foundation Director of Development Susan Sims said the Foundation was thrilled that Select had chosen to continue to support the work it was doing.

"We respected Karen's drive and her support for us; her commitment to and enthusiasm for the work of our researchers and scholarship recipients was truly extraordinary. While the company support carried a business angle, it was her personal interest in the discoveries being made which really fired her imagination. We are proud that Select's support for on-going research will continue the legacy."

THE BRENSSELLS

Dunedin PaperPlus owners John and Jacqui Brenssell say supporting the Otago Medical Research Foundation is a great way of being involved with the community.

Medical research has an important place in Dunedin, so supporting these studies is one way of giving back, it also helps to make sure the vibrancy of being a University city continues.

Their PaperPlus business hosts book events, donates prizes for Foundation events, and has sponsored several scholarships.

Jacqui says having such a strong link with the Foundation is something they appreciate. "It's nice to be able to use our resources to give back."

"We enjoy hosting book events and the feedback we get from supporters of the Otago Medical Research Foundation is that they value the opportunity to meet some of their favourite authors – hosting cooking celebrities Nadia Lim and Chelsea Winter for instance were very popular."

She likes the fact that they are helping improve health,

given the Foundation's research touches everyone. "We all have an interest in health after all."

"Our input helps to support grassroots projects that may not have otherwise got off the ground – that can potentially discover something really significant. It's great to think we have a part to play in having that kind of impact."

"Our daughter who works in the health profession could be seeing the benefits of something we're contributing to."

"And at the same time it also supports a young researcher - we're giving young people a start, giving them the opportunity to test their skills and abilities on something new to see where it might take them."

"We're always fascinated when we read the updates on just what our scholarship student is studying."

It's a positive relationship for us, for the Foundation and for the community.

THE STONELAKES

Everyone benefits from medical research, and that's one of the reasons why Justin and Eterei Stonelake have chosen to support the Otago Medical Research Foundation.

The couple own the three McDonalds restaurant franchises in Dunedin, and as such are regularly called on to support worthy community projects.

But helping to fund medical research is something they are particularly proud of, simply because they know how much it makes a difference, both in their own community, and to world knowledge on human health.

"As members of our community, and as employers, we have a responsibility and willingness to help in a proactive and positive way."

Sponsoring a summer studentship, and providing prizes and financial support for the Foundation's events is the Stonelake's way of recognising that local research investment can potentially help a lot of people.

The couple gives credit to the Foundation's leadership role in creating awareness of their research, why it is important to the community, and how to become involved.

As they point out, the life we all lead benefits from the work previous medical researchers have started.

Helping mothers and children is particularly close to Eterei's heart. As a mother herself, she is particularly conscious that years of research into childbirth paved the way for safe caesarean births, and that research continues to find new innovations.

"Someone was brave enough to pioneer a new way of doing something, and someone else was equally brave in believing and investing in them. We're grateful for that, and we want to be the ones that also put their hand up and say we trust in your good idea and want to help," she said.

"We appreciate that the Foundation funds worthy research, and we're pleased to have the opportunity to be part of it – it's our legacy of giving back."

JAN WARBURTON

Giving talented young people an opportunity to develop is important to Otago Medical Research Foundation sponsor Jan Warburton.

Jan is passionate about the arts, and a well-known long-time supporter of the development of contemporary art in New Zealand through her charitable Trust. Many aspiring young artists have benefitted from her support.

It seems like a natural progression to extend that altruism and to sponsor researchers through the Foundation's summer studentship programme. She has committed to the studentship sponsorship over five years.

Jan, a retiree living in Dunedin, says it's good to be involved in something that is a uniquely Dunedin/Otago thing.

"I have the opportunity to do something, and I enjoy helping where I can, so this is a positive way to give back. Giving young New Zealand people a hand, where they are emerging artists or potential researchers, gives them a taste of what is possible, and helps them to develop their skills and extend their talents. It's rewarding."

"One of my daughters studied health sciences a few years ago and did a summer scholarship so we know first-hand the benefits of the programme; it's great to be in a position to help other people to have that research opportunity."

"It's interesting to see the array of studies the Foundation funds each year, and to get a report on each of the projects I have supported – including one on feeding premature babies. It's a good way to feel involved in the project, and to know your support has made a little difference."

A REPORT FROM THE DIRECTOR OF DEVELOPMENT

2018 finds the Otago Medical Research Foundation marking 50 years of funding medical research in Otago.

I have thoroughly enjoyed my early days as the new Director of Development. It has been a steep learning curve with understanding the relationships we have across the research community and our supporter base in my first role in the charitable sector. I have appreciated and enjoyed the support and sharing of institutional knowledge that has come my way in these first months.

My predecessor, Steve Davie, has continued to work with the Foundation as Event Manager running our major events. I appreciate the tireless work that Steve does in his role, further building on his success with the Night to Remember, Club Otago and golf day, to bring in funding so necessary for the Foundation.

The commitment of our donors and loyalty to our cause is extraordinary. The genuine interest they take in our work is heartening and their generosity is humbling. You will see a small selection of supporter profiles in this year's report indicative of the breadth of support the Foundation is so grateful for.

The Scientific Committee is the cornerstone of the work of the Foundation. Professor Greg Jones is the newly appointed Chair of the committee, taking over from Assoc. Professor Pat Cragg who did a wonderful job at the helm. The committee assesses each and every application for research funding and scholarships, and selects the very best to ensure that the Foundation is supporting the students, researchers and projects which will have genuine impact.

One of our biggest challenges is to convey to the wider public of Otago, what we do. Even after 50 years funding local research, many people here in Otago do not realise how much medical research is happening right here on their doorstep. We need to further promote our work and that of the researchers we support, to provide better understanding and increase the support base for research across all parts of our region.

To this end we made the decision to update our logo and design with the help of Glow Consulting, who have worked with us to develop cohesive, fresh branding to underpin our work. We're delighted with the new look, based on the colours that are immediately recognisable as those of the Otago region. As we look to further grow our support base across the region, you will see more of the stories from our supporters and researchers, with the new branding in place.

My sincere thanks to the OMRF Council, a committed group of highly skilled governance experts chaired by Ken Dempster, who bring a variety of business and academic skills to the OMRF table. I also want to acknowledge the terrific behind-the-scenes support provided by Deloitte; diligent portfolio management by Craigs Investment Partners, who ensure our financial position is healthy; and Crowe Horwath, our auditors. This level of expert support provides our funders with confidence in the continued longevity of the Foundation and the impact of their donations.

I look forward to the coming years with great enthusiasm. It makes me proud to see the students and researchers we support, advancing their careers and contributing to the body of knowledge internationally, across a broad range of medical conditions. We are a proactive funder, with a track record of supporting excellence in innovative medical research.

Susan Sims
Director of Development

FUNDS RAISED

A Night to Remember
$84,064

Community Grants and Donations
$247,135

2018 Golf Tournament
$20,086

Club Otago
$45,768

Bequests
$152,979

GRANTS:

RD & B Calvert Charitable Trust
Crowe Horwath
Deloitte
A Goulding
Hughes Family Trust
J & E Stonelake
JAD Iverach Memorial Fund
J N Lemon Charitable Trust
Otago Diabetes Trust
Paper Plus Dunedin
Southern Victorian Charitable Trust
The Healthcare Otago Charitable Trust
The Otago Community Trust
Werribee Trust (Wyn & Dorothy Chirnside)
William Downie Stewart Charitable Trust

BEQUESTS:

Ethel Johnston Charitable Trust
Estate Frances Kennedy Miles
S A Rowley

DONATIONS:

F J Austin
G Barbezat
Karen Bardwell *(in memory of)*
Mike Bird & friends
J Burton
Caversham Pharmacy
S O Chin
M Coleman
A Cook
K Dempster
Gilmour Motors
AC & KM Greave
S & N Jones
Kiwi Karma
John Levido
Lion Foundation
G Lowry
J Mortimer
Richard Roberts
SpecSavers Dunedin
M Turner
Dr & Mrs GP White
S Wilbanks
S Wilkinson
KG Wilson *(in memory of)*

EVENTS

A Night to Remember 2018

A Night to Remember 2018 certainly lived up to its billing

Our speakers – *Mao's Last Dancer* Li Cunxin and cricketing legend Sir Ian Botham – provided a perfect balance, the generosity of our sponsors and donors, and those who bought raffle tickets and bid in the auction ensured a record sum of nearly $110,000 was raised, the wining and dining was world-class, and Shane Cortese and his 8 Track Band had the dance floor jumping in a two-hour grand finale.

Li enthralled the 450-strong audience with his story of growing up in abject poverty in rural China, the moment in time when he was chosen to attend Madame Mao's dance academy, his defection to the west and the resulting political fallout, his success as a dancer and his life now in resurrecting the Royal Queensland Ballet.

His speech was pure inspiration and he received a standing ovation.

In a Q & A joyride, Sir Ian gave us an insight into his life as a cricketing superstar in the 1980s, how he mixed it with the best and his superb work over many years in raising money for children affected by leukemia … in 16 long-distance walks over 20 years Sir Ian has raised almost £40-million with the research undertaken resulting in real progress in fighting the disease.

It was a fantastic night of emotion, entertainment and enlightenment, and we were privileged to host two genuine identities.

The night's sponsors were *Select Recruitment (Naming Rights), OceanaGold NZ, Vero Liability, Southern Trust (all Associate) and Forsyth Barr, NZI, Misha's Vineyard, Armstrong Prestige, Metro Realty (Sharon Hyndman & Kees Meeuws), Crombie Lockwood, Liquorland Leith Street & Andersons Bay, and Anderson Lloyd (all Supporting Partners).*

Auction items were donated by *Michelle Chalklin-Sinclair (The Artist's Room), Skyline Enterprises, Farry Riddell Consultancy, the Jack's point, Cromwell and Queenstown Golf Clubs, Experience Dunedin, Highland Helicopters, Steev Peyroux, Misha's Vineyard, celebrity chef Al Brown, Hannagan & Grieve Travel Associates, Air New Zealand, Bacchus Wine Bar & Restaurant, Lani Hagaman (Scenic Hotels), Armstrong Prestige, New New New Corporation, Stu Stevenson.*

Our raffle donors were *Whitestone Cheese, Skin Health Studio, Suits on Wall St, Rialto Cinemas Dunedin, MAHER Shoes, Preens Drycleaners, Nova, Klone Hair, Amisfield Vineyard & Bistro, Farmers.*

2017 Foundation Golf Tournament

After a wet and cold week, the weather gods relented and produced perfect conditions for the Foundation's eighth annual golf tournament, staged again in association with OceanaGold NZ Ltd on the picturesque St Clair course.

A record entry of 29 teams contested this year's tournament with the event played as ambrose under Florida Scramble rules.

There were closest to the pin prizes on each of the Par 3 holes, a closest to the pin with players' second shots on the 11th green, a straightest drive up the 2nd fairway, and a longest putt competition on the 18th green.

Through the support of OceanaGold (our naming rights' sponsor), our hole sponsors, team entries, prize donors and the players' generosity on the day with the longest putt promotion and raffle, just over $20,000 was raised – this to be directed towards a research project in mid-2018.

Almost $150,000 has now been generated through the tournament since the small, inaugural event in 2010 with much of the study established as a result of significance. Funds raised at the 2016 event have been invested in an investigation about the part the brain plays in the effects of menopausal women, while the study set alight from the 2015 tournament continues to make progress in determining how to make the body's immune system better tuned to fighting solid cancerous tumours which can be resistant to traditional chemotherapy and radiotherapy treatment.

The day's sponsors were OceanaGold NZ Ltd, the Tarn Group, Unichem Mornington Pharmacy, Mr Patrick Dawes and Dr Alan Wright (Marinoto Clinic), Deloitte, Palmers Mechanical, Southern Colour Print, Craigs Investment Partners, Armstrong Prestige, McDonald's Dunedin, Payless Energy, Forsyth Barr, Polson Higgs, RD Petroleum and Myers Marketing.

Appreciation is also extended to our prize and refreshment sponsors and others who played a part today: Calder Stewart Industries, Dr Brian McMahon, Dr Jenny McMahon, Maher Shoes, Aravin Vineyard, Valspar New Zealand, Rialto Cinemas Dunedin, Gardens New World, Stu McCullum (Wilson Staff Golf), Forbury Park Trotting Club, the Dunedin Casino, John Griffin at Jack's Point, Mitchell's Tavern, ANZ Private, Fraser & Lisa at inGOLF Dunedin, helloworld Dunedin, Click Property Management, Chris Timms, the Orokonui Ecosanctuary, Forsyth Barr, Fulton Hogan, Magoo Auto, Armstrong Prestige, the Brothers Hotel and Specsavers Dunedin.

And the individual team entries are also acknowledged - Ken & Liz Dempster, the defending WhatsoEver team, Lab Supply Ltd, Select Recruitment, Signature Property, Mike Bird, Heath Johnson, Fulton Hogan, Chris Timms and a team representing the Foundation.

It was a terrific day out!

THE RESULTS WERE:

- **Closest to the pin:** 4th – Richard Fogarty, 7th – Ray Hall, 13th – Owen Diack, 16th – Mark Tuten.
- **Closest to the pin (2nd shot on 11th)** – Eric Bygate.
- **Straightest drive** – Bruce Grant.
- **Longest putt** – Kevin Sullivan.

TEAM RESULTS:

- **1st:** playing off a handicap of 6.625, nett score of 54.375 – Forsyth Barr (Peter Young, Jeremy Anderson, Adam Gain, Will Young)
- **2nd:** 5.5, 55.5 – RD Petroleum
- **3rd:** 9.875, 56.125 – Mitchells Tavern
- **4th:** 9.75, 57.25 – Polson Higgs
- **5th:** 4.75, 58.25 – Myers Marketing
- **6th:** 8.25, 58.75 – Otago Medical Research Foundation
- **7th:** 10.125, 58.875 – OceanaGold NZ # 1
- **8th:** 5, 59 – Palmers Mechanical
- **9th:** 6, 59 – the Tarn Group
- **10th:** 1.625, 59.376 – Chris Timms
- **11th:** 6.625, 59.375 – Whatsoever Ltd
- **12th:** 7, 61 – Mornington Pharmacy
- **13th:** 6.625, 61.375 – Gardens New World
- **14th:** 7.625, 61.375 – Mike Bird

OMRF CLUB OTAGO LUNCH SERIES

The Club Otago lunch series continues to be a jewel in the Foundation's fundraising crown.

Since the first lunch in April 2012, almost $500,000 has been generated through members' annual subscriptions and the popularity shows no sign of abating.

The first lunch of the year featured a celebration of the 1950, 1959, 1966 and 1993 Otago rugby teams, which had all toppled the visiting British and Irish Lions sides. The oldest living All Black, Otago's Ron Elvidge, who played in the 1950 match, was honoured by way of video tribute while the '59, '66 and '93 teams were all represented by players in person.

On the eve of the Highlanders beginning their own tradition with their win over the 2017 Lions, this lunch was a special observance of the occasions and the players who created a slice of Otago sporting history.

Our other speakers during the year were the Prime Minister Bill English in his first week of campaigning for the 2017 general election, business identity and passionate Dunedin advocate Ian Taylor, who talked about his success with Animation Research and his unwavering backing of the proposed Dunedin Steamer Basin development, and former New Zealand and Welsh Rugby Union chief executive David Moffatt, whose thoughts on where the game is heading were a reminder that rugby may well be in serious trouble.

It is desperately sad to report during the year the passing of one of Club Otago's most dedicated (and, indeed, of almost every event staged by the Foundation) supporters. Oyster Executive Recruitment and Select Recruitment founder Karen Bardwell died early on Boxing Day morning, leaving behind two bereft families – her sons, parents and siblings, and her work family who she loved almost as much.

Karen was a friend to thousands and an influence in and on Dunedin we never for a moment contemplated losing so soon.

JOIN US

To join Club Otago, simply go to our website **omrf.org.nz/club-otago/** and fill out the form or contact Susan Sims at **susan.sims@omrf.org.nz**

Membership of Club Otago is open to anyone. Membership fees cost as little as $250 per year, of which all goes towards funding medical research.

Our members in the 2017/2018 year were:

PATRONS

SENIOR FELLOW

Otago Polytechnic

FELLOW

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Dr L Wise
President of the Otago Medical
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School of Biomedical Sciences
University of Otago

Prof G Jones
Chairperson from 1st June 2018
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PROFESSOR GREG JONES

Professor Greg Jones is the new Chair of the Scientific Committee for the Otago Medical Research Foundation.

Along with the wonderful work he does voluntarily for the OMRF, Professor Jones' focus is on research projects based in the Department of Surgical Sciences in the Dunedin School of Medicine.

Professor Jones, and a team of University of Otago researchers have developed a process that could revolutionise aneurysm management – and save lives. An aneurysm – a blood-filled bulge in a weakened blood vessel wall – is most commonly found in the aorta. Often described as "ticking time bombs", aneurysms can be managed if they are detected early. There are aortic aneurysm screening programmes for those considered high risk, but Professor Greg Jones says the 30mm measurement used to define an aneurysm is based on the average size of blood vessels in men. This does not account for differences in body size, particularly in women. When blood vessel measurement is adjusted to reflect body size, his team showed that men and women have similar risk.

"The New Zealand study clearly showed we are underestimating the true prevalence: women and smaller men have more chance of having an aortic aneurysm than health professionals previously realised."

This is a particular problem in New Zealand, with a high prevalence of Māori women who smoke and are, therefore, at higher risk. "Using this false assumptio n has likely contributed to a health inequality."

The researchers are working with a national consortium of vascular surgeons on a pilot study to test a new screening programme with standards taking body size into account. The bench-to-bed research has taken a basic interest in biology through to community health delivery. "It's a game changer that will save lives, but the discovery is controversial, as global screening programmes are based on a belief that aortic aneurysms are a disease primarily of men. This assumption will have to change."

> "Global screening programmes are based on a belief that aortic aneurysms are a disease primarily of men. This assumption will have to change."
>
> PROFESSOR GREG JONES

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SCIENTIFIC COMMITTEE REPORT

1 July 2017 to 30 June 2018

1. MEMBERSHIP

Chair: **Associate Professor Pat Cragg** (Nominee of the Otago School of Biomedical Sciences) *until 31 May 2018*
Professor Greg Jones *1 June 2018 onwards*

Deputy Chair: Professor Greg Jones **(Co-opted)** *until 31 May 2018; replacement pending*

Dr Hesham Al-Sallami (Co-opted, *November 2017*)

Dr Andrew Bahn (Nominee Otago Medical School Research Society)

Dr Chris Brown (Co-opted)

Dr Cathy Chapple (Co-opted)

Dr Heather Cunliffe (Co-opted)

Professor Bob Hancox (Nominee Dunedin School of Medicine, *until mid-May 2018*)

Dr Nick Heng (Co-opted)

Associate Professor Keith Ireton (Co-opted)

Associate Professor Rajesh Katare (Nominee of the Otago School of Biomedical Sciences, *June 2018*)

Associate Professor Ivan Sammut (Co-opted)

Dr Damian Scarf (Co-opted)

Dr Jon Schemmell (Nominee Otago Medical School Research Society, *until July 2017*)

Professor Rob Walker (Co-opted)

Dr Joanna Williams (Co-opted)

Dr Lyn Wise (President Otago Medical School Research Society)

Dr Stephanie Woodley (Nominee Otago Medical School Research Society, *March 2018*)

The Scientific Committee is primarily concerned with adjudicating on applications for Research Grants and on applications from students for Summer Research Scholarships. To cover the breadth of topics submitted, the committee is relatively large to ensure it has representatives from all the major sub-disciplines of medical research.

In the middle of 2017 there was one resignation from the committee: Dr Jon Schemmell who joined the committee in March 2016, and we thank him for his input; and very recently (mid-May 2018) Professor Bob Hancox resigned and we thank him for his considerable input since 2005. From late 2017/early 2018 we welcomed from the University of Otago Dr Hesham Al-Sallami, a co-opted member to represent the School of Pharmacy, and Dr Stephanie Woodley as the nominee of the Otago Medical School Research Society: and commencing July 2018, Dr Sierra Beck, as the nominee of University of Otago's Dunedin School of Medicine. A vacancy for a nominee of the Otago Branch of the NZ Medcial Association continues. At the end of May 2018 Associate Professor Pat Cragg retired from the University and relinguished her position as Chair of the Scientific Committee which she had held since 1992 (with membership since 1989).

The baton has been passed to the experienced Deputy Chair, Professor Greg Jones, who has been a member of the Scientific Committee since 2003. In June 2018 the committee welcomed Associate Professor Rajesh Katare as the new nominee of the University of Otago's School of Biomedical Sciences, replacing Associate Professor Pat Cragg who had held that position since 2004.

Note: *Most, but not all research projects, have protocols that require approval by the appropriate Ethics or Safety Committee prior to commencement of the research. Agreement by the Foundation to fund research projects is thus subject to receipt by the Chair of the Scientific Committee of a letter from the University of Otago's Animal Ethics Committee, Human Ethics Committee or Human Ethics Committee (Health) (or the Ethics Committee of a Health Funding Authority) indicating that the research has received full ethical approval. Work involving genetically modified organisms requires evidence of approval from ERMA or from the University of Otago's Institutional Biological Safety Committee.*

The scientific activities of the Foundation (advertising of up-coming grants and listings of awards) can be found on the following web site **www.omrf.org.nz**

2. SUMMER RESEARCH SCHOLARSHIPS 2017/2018

One hundred and ten applications (compared with 104 the previous year) for an OMRF summer research scholarship were received from the University of Otago in late August 2017, of which 19 (cf 23 last year) were recommended for funding by the OMRF (and at least 55 of the other applicants gained scholarships from other funding bodies or the Division of Health Sciences and its Schools; other sources and departmental studentships ensured a further 20 students also engaged in summer research). Of the 19 students funded by the OMRF, two were studying biomedical science, two dentistry, five medicine and ten science. It should be noted that the ten-week summer research is not part of the study required in a student's tertiary qualification and any data obtained during the summer research cannot contribute to the dissertation or thesis of such a qualification.

Each OMRF scholarship was worth $4,000 except for the two students with the highest scores who were awarded named Summer Research Scholarships ($5,000) – named in honour of the late Allan Wilkinson and the late Emeritus Professor Garth McQueen. Allan was Secretary of the Foundation from its inception in 1967 until his retirement in 1993 and Garth was a foundation member of the Foundation and one of the instigators of the formation of the Foundation's Auxiliary. One of the projects was funded from the Foundation's Iverach Fund, another was administered by the OMRF but sponsored by the Otago/Southland Diabetes Research Trust and one was funded by existing OMRF funds.

Due to the continuing sponsorship drive of the OMRF, all the other 14 OMRF scholarships were funded by: Ailsa Goulding, Deloitte, Healthcare Otago Charitable Trust, Hughes Family Trust, Jan Warburton, Paper Plus, RG & B Clavert Family Trust, Southern Victorian Charitable Trust (5), Stonelake and Werribee Trust. The involvement of Otago commercial companies and the Otago community for a seventh year in supporting summer research by tertiary students is very much appreciated.

The OMRF summer research scholars also attended a very successful two-day Workshop in Science Communication (27-28 November 2017) run specifically for the OMRF by the University of Otago's Centre for Science Communication. One outcome of the workshop is the production of short videos about each research project, which can be accessed via the OMRF website: omrf.org.nz

All scholars returned good to excellent reports at the end of February 2016. The **Renshaw Prize** ($250) for the best report was awarded this year to **Simone Thomas**, who worked under the guidance of Professor Vernon Ward of the Department of Microbiology & Immunology. Two students also received commendations.

The following is a list of the summer scholars and summaries of the projects undertaken – additional information on these projects can be obtained from the Chair of the OMRF Scientific Committee or from the supervisor concerned.

SIMONE THOMAS

(Professor Vernon Ward & Ms Vivienne Young, Department of Microbiology & Immunology, School of Biomedical Sciences, University of Otago)

Title: Does a human norovirus protein disrupt the host cell replication cycle?

(Stonelake Scholar)

Renshaw Prize Winner for the best OMRF summer research scholar report

Noroviruses are a major cause of gastrointestinal illness. Because human noroviruses are hard to grow in culture, many studies use murine (mouse) norovirus (MNV). A murine norovirus protein called VPg can disrupt the host cell cycle. This study asks if human Norwalk virus (NV) VPg also has the same activity. This required the expression of a tagged version of NV VPg in cells to allow detection of the protein and determination of the effect of that protein upon the cell cycle. NV VPg with a detectable peptide tag was expressed in cells and confirmed as being able to disrupt the cell cycle, similar to MNV VPg. This result is the first step in translating the research from a mouse model to human norovirus. Having a NV VPg that can be detected will facilitate studies into the mechanism by which the protein has this effect.

HAMISH AITKEN-BUCK

(Dr Peter Jones, Department of Physiology, School of Biomedical Sciences, University of Otago)

Title: Novel regulator of heart function, protein kinase G, has no functional effect on the key cardiac Ca^{2+} release channel, despite altering its structure

(Southern Victorian Charitable Trust Scholar)

Commendation for an excellent summer scholarship report

The release of calcium (Ca^{2+}) from stores inside cardiac muscle cells is critical to heart contraction. Under certain conditions, such as a stress response, the extent of Ca^{2+} release is enhanced by modifications to key Ca^{2+}-handling proteins by enzymes that are minimally active at rest. One such enzyme, protein kinase G (PKG), is thought to play a role in this cardiac stress response; however, specific protein targets for PKG-driven modification remain ambiguous. Furthermore, whether PKG-driven modification translates into altered Ca^{2+} release remains to be seen. To address this, we perfused cells expressing the key Ca^{2+}-release protein, the ryanodine receptor (RyR2), with a PKG-activating solution. We found that PKG can modify the structure of RyR2 at a novel site, although

this did not translate into a change in RyR2-driven Ca^{2+} release, suggesting that PKG changes the contraction of the stressed heart via a mechanism independent of direct changes in RyR2 function.

SHREYA BIR

(Associate Professor Rajesh Katare, Department of Physiology, School of Biomedical Sciences, University of Otago)

Title: Revolutionising the diagnosis of diabetic heart disease

(Otago/Southland Diabetes Research Foundation Scholar)

Tiny molecules in the blood, known as microRNAs, are hoped to be the future in diagnosing the early stages of diabetic heart disease (DHD), a common and often fatal heart condition. Current techniques are invasive, have limited reliability, and with over 80% of diabetics dying from heart disease, the development of a quick blood test may prevent many unnecessary deaths. Blood samples were taken from volunteers who had had diabetes for varying lengths of time, and the levels of specific microRNAs-1, -34a and -208a were measured. It was found that for patients, who were taking first-line diabetic medications, microRNA-1 (a marker for cell death in the heart) and microRNA-34a held the potential to detect DHD. MicroRNAs are still a very new and exciting area of research and holds the promise to provide solutions to many medical problems and open new avenues of research that we may not yet be able to imagine.

STEPHANIE CHO

(Dr Wayne Patrick, Department of Biochemistry, School of Biomedical Sciences, University of Otago)

Title: All hope may not be lost: potential vulnerability in antibiotic-resistance microbes

(Garth McQueen Scholar)

As microbes speed ahead, evolving resistance to all known clinical antibiotics, new drug development lags behind, and our hopes to gain an edge in the 'antibiotic arms race' diminish. However, recent research shows that the evolution of resistance comes with an exploitable underlying vulnerability: resistance against one antibiotic provokes increased sensitivity to others. Known as collateral hypersensitivity, this project aimed to explore this phenomenon. The opportunistic pathogen *Staphylococcus aureus* was evolved to be resistant to three antibiotics while in parallel, collateral hypersensitivity towards 72 different antimicrobials was also assessed. From this profiling, the evolved strains showed no difference in resistance (compared to parental strain) towards 45 compounds and increased resistance towards 23. However, the evolved lines had reduced resistance against 4 compounds, suggesting potential collateral hypersensitivity hits. Ultimately, this hints at new strategies to combat antibiotic resistance, without demanding novel drug design.

WILLIAM CLARK

(Professor Michael Colombo, Department of Psychology, Division of Sciences, University of Otago)

Title: Neurons in a higher visual area of the pigeon brain respond selectively to faces

(Alisa Goulding Scholar)

Our ability to recognise a face is dependent on a series of highly specialised neurons. Prosopagnosia (a difficulty in recognising faces) and Alzheimer's disease impair the normal function of these neurons. To provide novel treatments for individuals affected by these disorders, we require a greater understanding of how faces are processed by the brain. Our primary aim was to develop a non-primate animal model for disorders of facial recognition. We hypothesised that neurons would respond only to images of faces. We trained nine pigeons to discriminate between two image sets that included pictures of faces and non-face objects while recording from neurons in the visual system. No neurons were found that only responded to faces. However, we demonstrated that three unexplored areas of the pigeon brain contain high proportions of visual neurons. Further research is required to determine how these areas of the avian brain process faces.

NATSUKO FUSHIDA-HARDY

(Associate Professor Keith Ireton, Department of Microbiology and Immunology, School of Biomedical Sciences, University of Otago)

Title: Investigation into the role of cell microtubules and proteins in Listeria infections in humans

(Southern Victorian Charitable Trust Scholar)

Listeria entry is mediated by the interaction of bacterial surface protein InlB with the human tyrosine kinase receptor Met. Unlike the host actin cytoskeleton, the role of host microtubule cytoskeleton in the entry of *Listeria* remains poorly understood. In a recent PI3K kinase pathway screening, depletion of LL5α (PHLDB1) and LL5β (PHLDB2) caused a significant reduction in entry of *Listeria*. I sought to investigate whether microtubules

are required for the re-localisation of LL5 proteins from focal adhesion points to the sites where InlB interacts with Met. I also examined the role of host microtubule regulating protein CLASP2 in translocation of the LL5 proteins. Treatment of cells with a microtubule depolymerising agent resulted in a slight decrease in the recruitment of LL5α and LL5β recruitment around InlB coated beads.

REES GUISE

(Dr Fiona Doolan-Noble, Professor Tim Stokes & Mr Kyle Forde, Department of General Practice and Rural Health, Dunedin School of Medicine, University of Otago)

Title: How do GPs use codes in their electronic medical records to indicate that a patient has a learning disability?

(HealthCare Otago Charitable Trust Scholar)

General practitioners (GPs) use a code made up of numbers and letters to represent characteristics about patients which they record in medical records. For patients with learning disabilities (LDs), it is thought coding happens less frequently. This study aims to identify common codes used to identify those living with LDs, the barriers to coding, and to determine if provision of preventive health services varies between those living with and without LDs. Information was gathered using a survey and a clinical audit. The READ codes used by participating GPs to identify those living with LDs were similar to those used by British GPs. Barriers to READ coding were comparable to those in the literature. Those living with LDs were more likely to be smokers but less likely to receive support to quit. This gap in the provision of smoking cessation support we have identified requires further research as it points to healthcare inequalities.

JESSICA HARTE

(Associate Professor Merilyn Hibma & Ms Allison Tschirley, Department of Pathology, Dunedin School of Medicine, University of Otago)

Title: The effect of HPV cancer proteins on host immunity

(Hughes Family Trust Scholar)

Human papilloma virus (HPV) is the leading cause of cervical cancer, causing the development of premalignant lesions that can then progress to cervical cancer. The progression to invasive cancer is assisted by virus-mediated immune evasion, reducing the ability of immune cells to detect the virus. This study explores the regulatory effects of HPV proteins on the incorporation of a fluorescent protein into host cells and the particles these cells shed. This study further determined the efficacy of the drug Y-27632 and its ability to suppress shedding of particles from host cells.

ANNE JUDE

(Dr Dawn Coates, Dr Gemma Cotton, Professor Warwick Duncan & Ms Syarida Safii, Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago)

Title: Nanosilver as an antimicrobial for dental implants

(Southern Victorian Charitable Trust Scholar)

Everybody loses teeth eventually. When this happens, dental implants can be screwed in, supporting an artificial tooth. If jaw bone healing fails, implants fail. Moa Bone® (MB) is a product from cattle found to increase human jaw healing, securing implants. However, there is a high chance of infections. To solve this, we turn to nanotechnology. Silver nanoparticles destroy bacteria but may also be harmful to human cells. Our aim was to find concentrations of nanosilver where human gum cells are still alive. We found such concentrations do exist, revealing silver nanoparticles to be no more harmful than Chlorhexidine, a dental mouthwash. We now know that nanosilver can be both harmful to bacteria and safe for human cells. The next step is to combine the silver nanoparticles with MB, creating a product that allows people to retain the implants that replace their missing teeth – safe healing without infection.

CAMERON KEELTY

(Dr Bill Hawkins, Department of Chemistry, Division of Sciences, & Professor Parry Guilford, Department of Biochemistry, School of Biomedical Sciences, University of Otago)

Title: A new paradigm in drug design

(Otago Medical Research Foundation Scholar)

Several compounds were developed to test for potential treatment of E-cadherin tumours, which is hypothesised to have drug-based vulnerabilities. The compounds produced were developed based on testing of over 100,000 compounds, from which several were identified to be possible candidates for treatment. Using data from different variations of one of these candidates, a specific therapeutic target can potentially be produced. The variations of the compounds produced were based around replacing a nitrogen atom with an oxygen atom, however due to time constraints, the compounds produced are yet to be tested, and therefore the usefulness of this change is yet to be seen.

MANISH KUMAR

(Dr Erwin Lamping, Dr Hee Ji Lee & Professor Richard Cannon, Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago)

Title: Studying the extracellular domains of the Candida albicans multidrug efflux pump Cdr1

(Werribee Trust Scholar)

The human commensal yeast *Candida albicans* can cause superficial skin infections that can become life-threatening invasive fungal infections in the immunocompromised. Azole antifungals are widely used to treat invasive *Candida* infections, but treatment can become difficult for azole resistant isolates overexpressing the multidrug efflux pump, Cdr1. Cdr1 is an integral membrane protein with six extracellular cysteines that are conserved among all plant and fungal efflux pump homologs. We investigated whether these six cysteines form disulphide bonds and whether they stabilize the three dimensional structure of Cdr1. We took a previously created, fully functional, Cdr1 protein that had all six cysteines mutated to serines and created five additional Cdr1 mutants with predicted disulphide bonds re-introduced either individually or in various combinations. The five newly created Cdr1 mutants were fully functional, which means that we are now in a position to confirm the three predicted disulphide bonds by mass spectrometry.

VALERY LIU

(Associate Professor Fiona McDonald, Department of Physiology, School of Biomedical Sciences, University of Otago)

Title: Targeting sodium (Na+) transport to control high blood pressure

(Allan Wilkinson Scholar)

Epithelial Na^+ channels (ENaC) maintain fluid and electrolyte balance by regulating Na^+ transport. Controlling ENaC density on cellular surfaces is an effective method of controlling Na^+ transport. This study aimed to determine whether the protein subunit, sorting nexin 17 (SNX17), was the key bridge between ENaC and the retromer – a protein complex responsible for ENaC recycling and thus determines cell-surface ENaC density. SNX-17 presence in ENaC expressing Fischer rat thyroid epithelia was reduced using SNX17-specific short-interfering siRNA (siSNX17). Protein- detection experiments were employed to visualise effectiveness of protein knockdown while electrophysiological techniques allowed the indirect quantification and comparison of ENaC density on siSNX-17 epithelia in comparison to the control by measuring Na^+ transport. Surprisingly, a greater ENaC Na^+ transport in siSNX17 epithelia was observed in comparison to the control. Results suggest SNX17 is not the key bridge as SNX17-knockdown did not reduce the Na^+-current. However, the results provided insights into the relationship between molecular- transport systems – particularly between the retriever and the retromer.

CONOR MCGUINNESS

(Dr Anita Dunbier, Department of Biochemistry, School of Biomedical Sciences, University of Otago)

Title: 'Friend, not foe' proteins: a new target for combination breast cancer therapy?

(RG and B Calvert Family Trust Scholar)

Commendation for an excellent summer scholarship report

Breast cancer remains the third largest cancer killer in New Zealand. Recurrence rates for breast cancer are high; even with the best available treatment, only 50% of patients show a response to therapy. One way in which cancer cells are able to grow uncontrollably is by evading the patient's cancer killing immune system. 'Friend, not foe', or immune checkpoint proteins are expressed by cancer cells and suppress the immune response. Targeting these proteins in breast cancer could thus lead to improved treatments for patients. Of note, I found that one of these proteins, called PD-L1, is expressed in tumour cells in response to hormone therapy, a treatment widely used for the most common form of breast cancer. This could be one mechanism by which cancer cells escape cancer-killing immune cells. Targeting this protein in combination with existing therapies could help improve treatments for breast cancer patients.

JOSHUA PRESTON

(Professor Dave Grattan & Dr Mohammed Rizwan, Department of Anatomy, School of Biomedical Sciences, University of Otago)

Title: Metabolic sensing in the hypothalamus

(Nadia Lim/Paper Plus Scholar)

Obesity and Type II Diabetes are increasingly growing problems in New Zealand. This means that a lot of research is needed to be done in these areas to determine the biological causes. A hormonal pathway called the Wnt/ß-catenin pathway is a pathway that appears to have a big role in the signalling of hormones in the brain that change after a meal. Specific statistical techniques were used to measure the change of hormone action in this pathway in rats that had eaten a meal in comparison to those that were fasted. In female rat brains, in one specific region, there

was a huge decrease in the levels of hormone action in rats that had eaten a meal compared to rats that were fasted. This data may enhance our understanding of the normal events that occur in the brain in response to a meal.

JOSHUA QUON

(Dr Lianne Parkin, Department of Preventive and Social Medicine, Dr Jack Drummer & Associate Professor Katrina Sharples, Department of Medicine, Dunedin School of Medicine, University of Otago)

Title: Are clinicians prescribing beta-blockers to New Zealanders with lung disease and co-morbid heart disease?

(Southern Victorian Charitable Trust Scholar)

Clinical guidelines in New Zealand recommend the use of beta-blocker drugs following acute coronary events (heart attack and severe chest pain), including in patients with chronic obstructive pulmonary disease (COPD). Despite past concerns, there is increasing evidence that the use of beta- blockers in patients with COPD is safe and increases patient survival. This study described the use of beta-blockers and other heart disease prevention drugs in New Zealand patients with COPD. The study was based on anonymised health data and included about 83,000 people who started taking long-acting inhalers for COPD between February 2006 and December 2013. Of the patients who had an acute coronary event during follow-up, just over half were not given a beta-blocker in the 6 months after the event. Further efforts are required to improve the use of beta-blockers in New Zealand patients with COPD and co-existing heart disease.

CAMERON REDDINGTON

(Dr Peter Mace, Department of Biochemistry, School of Biomedical Sciences, University of Otago)

Title: An interaction study: How do TRIB1 and CDC25 interact?

(Southern Victorian Charitable Trust Scholar)

TRIB1 (Tribbles 1) is a psuedokinase with a unique functional role; it degrades a plethora of proteins involved in regulating the cell cycle, such as CDC25 (Cell division cycle 25) and C/EBPα (CCAAT/Enhancer Binding Protein alpha.) When overexpressed, TRIB1 acts as an oncogene, dysregulating the cell cycle through the enhanced degradation of these regulatory proteins. The interaction of TRIB1 and CDC25 was investigated in this project, as this is protein-protein interaction that has not been extensively characterised before. A total of 10 expression constructs were made up, for two different isoforms of CDC25, used in both GST-pulldowns and Size Exclusion Chromatography (SEC) to probe for an interaction. GST (Glutathione S-transferase) pulldowns proved inconclusive, due to non-specific interaction between CDC25 and GST, while no strong interaction was detected using SEC. A more sensitive technique, such as Hydrogen Deuterium Exchange, or X-Ray Crystallography, may help to characterise this interaction in the future.

MATTHEW REILY-BELL

(Associate Professor Caroline Beck, Department of Zoology, Division of Sciences, & Dr Louise Bicknell, Department of Pathology, Dunedin School of Medicine, University of Otago)

Title: Making a model of seizures to test if a herb known as gotu kola has positive effects on intractable epilepsy

(Jan Warburton Scholar)

Almost 30% of epilepsy suffers have intractable epilepsy which currently cannot be cured. This research began to look at a herb from South America called gotu kola which may have properties that decrease the recovery time of intractable epilepsy suffers after they have seizures allowing them to get back to life sooner. This study aimed to make a model to test gotu kola in South African tadpoles. First, we established video recording protocols, then we fed tadpoles various diets and induced seizures using valproic acid (VPA). Tadpole seizures were analysed. Analysis results confirmed that our system could detect the effects of the known anti-epileptic drug, valproic acid. Results suggest that tadpole size and age affect how bad seizures caused by PTZ are. Finally, results did not show any benefit to tadpoles consuming gotu kola.

FRANCESCA TEMPLER

(Professor Terry Doyle, Department of Medicine, Dunedin School of Medicine, & Associate Professor Niels Hammer, Department of Anatomy, School of Biomedical Sciences, University of Otago)

Title: Re-examining assumptions about the human hind foot and heel pain

(J. A. Iverach Scholar)

Foot conditions such as tendinitis and heel spurs cause a huge amount of pain, expense and disability worldwide, yet surprisingly little is known about this part of our anatomy. In this clinical anatomy and radiology project, we studied tendon attachments in the human heel using a range of imaging and dissection techniques. A greater understanding of the structure of this region will help us determine how these problems arise and how

best to treat them. We are specifically looking at the dimensions and locations of heel spurs, as this will give insights into their aetiology, and at the correlations between dimensions of anatomical structures such as the Achilles tendon and the Plantar fascia, as this will tell us more about how these structures function together.

WILLIAM WARREN

(Dr Michael Jack, Department of Physics, Division of Sciences & Dr Sigurd Wilbanks, Department of Biochemistry, School of Biomedical Sciences, University of Otago)

Title: Investigating the molecular behavior of protein-folding chaperones

(Deloitte Scholar)

A protein, very similar to one involved in cancer development and other diseases, was purified. Once purified, it was altered in a way that allows study of the protein at a molecular level as it moves and acts on its normal substrate. To make data obtained this way better and reduce noise, an attempt was made to purify the protein based on its alteration type. This failed, potentially because of the storage conditions of the protein causing it to clump together. However, the method showed enough promise to potentially be useful to future researchers. This project also looked at turning this data into a real-world understanding of the protein. This involved computational modelling, and comparing ways of looking at the data. This was made easier to use, and fast enough to use, that reliable data could be generated within reasonable timeframes.

3. RESEARCH GRANTS AWARDED

(A) Annual Grants and Otago Community Trust Grants

These one-year grants are for research concerned with human health and the scientific basis of medicine. In June 2017 there were 25 applications from the University of Otago (cf 24 the previous year) totalling $635,280 and eight of these were funded at a total expenditure of around $171,567 of which $70,000 was provided most generously by the Otago Community Trust. These grants commenced between August and October 2017 and are nearing completion with full reports due 3 months after the one-year grant ends. Abstracts from the final report will be available on the OMRF website http://www.omrf.org.nz at the end of 2018. Progress as at the end of May 2018 is summarised below:

(I) ANNUAL GRANTS

Dr Erwin Lamping, Dr Nicholas Heng
(Department of Oral Sciences, School of Dentistry) &
Professor Richard Cannon (Sir John Wash Research Institute, School of Dentistry)

Engineering yeast as an indeal expression host for human P-glycoprotein (ABCB1) – AG 370

Sponsored by Mike Bird and Friends of the Foundation

P-glycoprotein (P-gp) pumps toxic compounds out of cells, but it also causes tumours to become resistant to anti-cancer drugs. Thus, we need to find inhibitors of P-gp in tumours without affecting its ability to protect healthy cells from toxic compounds. We accelerated natural evolution in the laboratory and created a 'humanised' version of a patented baker's yeast strain that produces high levels of functional P-gp in the absence of interfering endogenous efflux pumps. The genomes of the original strain and its 'humanised' offspring are currently being sequenced to discover the mutations that caused a 100-fold increased P-gp efflux pump function in our lab-evolved strain. In parallel, we are also studying P-gp efflux pump function in whole yeast cells and in isolated cell membranes. The ultimate aim is to develop a yeast-based, whole cell, P-gp efflux pump assay that allows simple, and cost-effective, screening for P-gp efflux pump substrates and/or inhibitors.

Dr Xinhuai Liu & **Professor Allan Herbison**
(Department of Physiology, School of Biomedical Sciences)

Understanding the role of the brain in the onset of menopause – AG 371

Sponsored by OceanaGold

The project was designed to elucidate mechanisms underlying the onset of menopause in women by investigating how changes in the brain relate to the endocrine alterations in a mouse model of menopause. Firstly, the mouse model was established successfully and the characteristics of this mouse model have been recorded and compared with reports in the literature. Secondly, an initial set of data showed changes in the brain that correlated with endocrine alterations. This requires further study to confirm the significance of these findings. Finally, a third group of mice is planned to investigate brain cell activity related to changes in the brain occurring prior to the appearance of menopause.

Dr Wayne Patrick (Department of Biochemistry, School of Biomedical Sciences)

Resistence is futile: Investigating collateral hypersensitivity to combat antibiotic resistance – AG 372

Sponsored by the JN Lemon Charitable Trust

By 2050, more people will be dying from antibiotic resistant infections than from cancer. Microbes have now evolved resistance to every available class of antibiotic. Rather than focussing on the costly development of new antibiotics, our team is investigating an alternative strategy that manipulates an aspect of evolution known as collateral sensitivity. Evolving resistance to one antibiotic sometimes results in a microbe becoming more sensitive to others. Currently, a detailed understanding of this phenomenon does not exist. To address this gap in knowledge, we have taken harmless laboratory strains of bacteria and forced each of them to become resistant to a single antibiotic. Then we have tested these evolved strains against 72 other antibiotics, to systematically map the patterns of resistance and sensitivity. In general, the evolution of resistance to one antibiotic makes the bacteria resistant to many more, too. More promisingly, however, our high-throughput approach is identifying examples in which resistance to one drug makes the bacterium more sensitive to another. Ultimately, we hope this laboratory-based research will translate into new guidance for clinicians, on the most effective antibiotic combinations that eliminate superbugs.

Associate Professor Bruce Russell (School of Pharmacy), **Dr Margaret Ryan** (Department of Anatomy, School of Biomedical Sciences) & **Professor Paul Glue** (Department of Psychological Medicine, Dunedin School of Medicine)

Can microRNA be used as a biomarker to predict treatment response in anxiety? – AG 373

Sponsored by Southern Victorian Charitable Trust

Low doses of the drug ketamine can relieve the symptoms of patients with treatment-resistant anxiety in less than 2 hours; this effect lasts for several days. This research aims to undertake a pilot study that combines MRI (magnetic resonance imaging) of the brain with measuring small amounts of specific compounds in the blood to determine whether the ketamine-induced changes can be predicted. Ethics committee approval for this research has been granted and patient recruitment and research is underway - we are imaging patients and storing their blood samples for analysis.

(II) OTAGO COMMUNITY TRUST GRANTS

The Otago Community Trust supports biomedical research in the Otago area with the proviso that the research is selected on topics that can relate well to issues understandable by the layperson. The four projects selected were:

Dr Louise Bicknell & **Dr Karen Knapp** (Department of Pathology, Dunedin School of Medicine)

Novel insights into the genetics of osteoporosis through studying the genome of a NZ family – CT 374

Osteoporosis is a chronic skeletal disease associated with decreased bone mineral density and structural deterioration of bone architecture, affecting more than 80,000 people in New Zealand and over 200 million people worldwide. Our current understanding of the genetic causes of osteoporosis is incomplete and a better understanding of bone physiology is essential to facilitate the ongoing search for improved therapeutics for osteoporosis. We have a unique opportunity for the discovery of both novel candidate genes and new mechanisms regulating bone remodelling in osteoporosis, through studying a New Zealand family in which a boy is severely affected by syndromic juvenile osteoporosis. We hypothesise that the striking severity of reduced bone mineral density in this child has an underlying genetic cause. We have undertaken whole-genome sequencing on the parents and child, and bioinformatic analysis is currently underway to prioritise candidate disease-causing mutations.

Professor Dirk de Ridder, Dr Sook Ling Leong (Department of Surgical Sciences, Dunedin School of Medicine) & **Associate Professor Patrick Manning** (Department of Medicine, Dunedin School of Medicine)

Infraslow neurofeedback for food craving in overweight and obese women, a pilot study – CT 375

There are several areas in the brain related to reward processing that encourage overeating. One implicated area is called the posterior cingulate cortex (PCC), which appears to function abnormally in overweight or obese individuals who show signs of food addiction. This study investigated whether infraslow neurofeedback, which utilises real time display of brain activity to allow self-regulation of brain function, may help reduce food craving in overweight or obese women with signs of food addiction who have abnormalities in the PCC. Participants received six sessions of neurofeedback (11 women) or placebo (10 women) over a three-week period. Findings suggest that infraslow neurofeedback targeting the PCC can alter brain activity and suppress food craving in these individuals. If proven to be therapeutic in a larger trial, infraslow neurofeedback may be a complement to current strategies for weight management.

Professor Warren Tate, Dr Eiren Sweetman, Mrs Tina Edgar (Department of Biochemistry, School of Biomedical Sciences) & **Dr Lynette Hodges** (School of Sport & Exercise – Massey University)

Bioenergetics of mayalgic encephalomyelitis/chronic fatigue syndrome – CT 376

Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) is a severe fatigue illness that is life-long and debilitating, affecting ~ 20,000 people in New Zealand. Our previous studies on a patient cohort suggested that both the energy powerhouse of the cell and energy producing pathways are not functioning normally. We are now using a newly acquired Seahorse analyser to measure oxygen consumption, energy production and capacity in live cells isolated from blood of these patients. This enables the derivation of an energy status indicator called the Bioenergetic Index. We have completed the establishment/optimisation studies and are now assessing patient/control pairs for their energy status. Eventually we want to test whether supplementation of the essential antioxidant (reduced CoQ_{10}), when targeted to the cell's energy powerhouse (as nutraceutical MitoQ), can restore energy function to the cells of these patients. It will test whether this is a helpful supplement for patients with this severe fatigue.

Professor Sarah Young, Dr Silke Neumann (Department of Pathology, Dunedin School of Medicine) & **Dr Andrew Clarkson** (Department of Anatomy, School of Biomedical Sciences)

Immune cells in the stroke environment – Drivers of differential outcomes in obesity? – CT 377

Stroke is one of the leading causes of death and long-term disability in New Zealand, with limited treatment options available. Inflammation of affected brain regions is a major complication of stroke and strongly impairs nerve cell repair and rehabilitation. Underlying medical conditions, such as obesity and diabetes dramatically increase the likelihood of experiencing a stroke and further impede healing. In this project, we aim to understand the role of immune cells that drive inflammation post-stroke and how these contribute to worse outcomes in obese patients. Analysis of peripheral immune cells infiltrating the brain post-stroke has shown that obese mice have a higher proportion of inflammatory monocytes. These cells are quick responders to injury and cell death and important for preparing the damaged tissue for regeneration. However, these cells can also cause further tissue damage through the secretion of inflammatory molecules. We are currently investigating the role of these cells.

(III) RECENT ANNUAL GRANT ROUND

In **June 2018** there were 20 applications from the University of Otago and one from a research laboratory external to the Unversity totalling $582,657. Four of these applications were funded by the Foundation and their sub-sponsors: Mike Bird's Friends of the Foundation, JN Lemon Charitable Trust, OceanaGold, Southern Victorian Charitable Trust ($108,000), and two by the Otago Community Trust ($70,000). Abstracts of the proposed work can be found on the following web site **http://www.omrf.org.nz**

(B) Laurenson Awards

Laurenson Awards are one-year grants for research concerned with the effects of diet and/or drugs on human health. In **December 2017** there were 17 applications (compared with 16 the previous year) from the University of Otago totalling $465,109 and three of these were funded at a total expenditure of $80,000. One grant ($25,000) was surrendered before commencing due to unexpected issues gaining a permit for a therapeutic trial. The two remaining grants commenced 1 February and 1 March 2018 and final reports are due at the end of April and May 2019. Abstracts from the final report will be available on the OMRF website **http://www.omrf.org.nz** mid 2019. Work in progress, as at the end of May 2018, is summarised below:

Associate Professor Mark Thompson-Fawcett (Department of Surgical Sciences, Dunedin School of Medicine), **Professor Gerald Tannock** & **Mr Blair Lawley** (Department of Microbiology & Immunology, School of Biomedical Sciences)

A probiotic to improve ileal pouch health – LA 382

Probiotics, or good bacteria, can improve health. Some patients with inflammatory bowel disease have their entire large bowel removed with surgery. To avoid a stoma bag, a pouch (new rectum) is made out of the end of the small bowel and joined to the anus. Half of these patients develop an inflammatory condition in their pouch called pouchitis. A small pilot study has been successful using a specifically developed probiotic for pouchitis. We now aim to conduct a larger study to prove effectiveness. Ethical approval is in progress. We needed to find a new probiotic supplier. Recently we have had very positive developments with a potential new supplier in China. We aim to be in a position to start the study toward the end of the year, which will run over 4 months.

Dr Ben Wheeler (Department of Women's & Children's Health, Dunedin School of Medicine), **Ms Deanna Beckett, Dr Carolina Loch** (Department of Oral Sciences, School of Dentistry) **Dr Erin Mahoney** (Paediatrics section of Department of Women's & Children's Health) & **Mr Andrew Gray** (Department of Preventive & Social Medicine, Dunedin School of Medicine)

What are the dental consequences of vitamin D deficiency during pregnancy and infancy? – LA 383

New Zealand children, particularly those living in the South Island, are at high risk of vitamin D deficiency. Deficiency during tooth development may result in developmental defects and dental decay. Data from a 2012 randomised controlled trial (RCT) is available for 126 women and their infants, including vitamin D status at multiple time points during pregnancy and after delivery. The children from this study, now between five and seven years of age, will be losing their first baby tooth, and gaining their first permanent molars. We aim to study potential childhood dental consequences of vitamin D deficiency during pregnancy and early life.

To date, the study is progressing well, with both participants and the research team finding the study valuable. As of mid-May 2018, 36 children have been recruited for the study (aiming for 80 in total) and 19 have undergone their dental assessments and completed the study. Recruitment continues, and overall we are well on track for study completion in early 2019.

(C) Jack Thomson Arthritis Fund

This OMRF fund was established in 2011 and was made possible by a bequest from the late Jack Thomson. In **December 2017** there were four applications (compared with eight in the previous year) from the University of Otago totalling $108,898 and three of these were funded at a total expenditure of ~$78,850. All grants commenced on 1 February or 1 March 2018 and final reports are due at the end of April or May 2019. Abstracts from the final report will be available on the OMRF website http://www.omrf.org.nz mid 2019. Work in progress, as at the end of May 2018, is summarised below:

Associate Professor Niels Hammer, Dr Stephanie Woodley, Dr Daniela Aldabe (Department of Anatomy, School of Biomedical Sciences), **Dr Daniel Cury Ribeiro** (School of Physiotherapy) & **Dr Melanie Bussey** (School of Physical Education, Sport & Exercise Sciences)

The functional link between hip joint mechanorecptors and neuromuscular control of hip muscles – JT 378

Hip joint osteoarthritis (OA) is a debilitating disease that impacts quality of life, resulting in around 8000 joint replacements in New Zealand per annum. Nerve receptors in the hip capsule may be involved in fine-tuning the muscles surrounding the joint, and failure of this mechanism might be related to hip OA, but its role is unclear. This study has established a novel experimental protocol to investigate the effects of nerve receptor stimulation in the hip capsule on the muscles surrounding the hip joint in healthy participants, as well as in patients with OA in the context of total hip replacement. This research gives the unique opportunity to revisit the hip capsule – a largely neglected part of the hip joint that potentially has functions ranging far beyond its well described role as a mechanical stabiliser.

Dr Paul Hessian & **Ms Melanie Millier** (Department of Medicine, Dunedin School of Medicine)

Insight into pathogeneic mechanism causing extra-articular complications in rheumatoid arthritis – JT 379

Rheumatoid arthritis is a chronic inflammatory disease associated with painful and swollen joints, often causing joint deformity. Rheumatoid inflammation also involves sites away from joint tissues, including development of rheumatoid nodule lesions in skin. Methotrexate is recommended as part of treatment for reducing rheumatoid disease activity. Ironically, nodules can develop with methotrexate therapy, even though joint inflammation improves. This proposal investigates this phenomenon, focusing on genes within nodules, apparently affected by methotrexate therapy.

Comparing nodules obtained from rheumatoid arthritis patients receiving methotrexate therapy with nodules from patients with no exposure to methotrexate, we have identified 12 genes that appear influenced by methotrexate therapy. We continue systematically working through each of these genes identifying the cells contributing to each gene's expression. Inflammatory macrophages and blood vessels are involved. We anticipate that once completed, our work will explain how methotrexate promotes rheumatoid inflammation at one site while having anti-inflammatory effect at others.

Dr Gisela Sole, Dr Daniel Cury Ribeiro, Dr Meredith Perry, Dr Craig Wassinger (School of Physiotherapy) & **Dr Nicola Swan** (Department of Psychological Medicine, Dunedin School of Medicine)

Feasibility of neuroscience-informed physiotherapy for persistent shoulder pain – JT 380

Shoulder pain is common in middle-aged and older people, often interfering in sleep, daily life, work and sport. Current treatment typically includes manual

therapy and exercises prescribed by physiotherapists, medication and, if not resolving, surgery. Besides considering patho-anatomical disorders, increased sensitivity of the nervous system and emotions, such as fear of movement, worry and stress, are also contributors for the pain. To address those factors, a 'neuroscience-informed' rehabilitation approach includes improving patients' understanding of the neurophysiology of pain and psychosocial aspects to enhance self-management and self-efficacy, in addition to manual therapy and exercises. Such an approach may keep persons participating in activities they value, and delay/prevent surgery. Thirty participants will be recruited from the communities and offered the programme in the Dunedin and Christchurch School of Physiotherapy Clinics. The study will determine whether this intervention is feasible within the NZ primary health care system, based in the two physiotherapy clinics.

4. OTHER ACTIVITIES OF THE SCIENTIFIC COMMITTEE

OMRF Student Speaker Awards at the Otago Medical School Research Society:

The Student Speaker awards are given to the student speakers who, in the opinion of a panel of three to four judges, gives the best and second best oral presentation – based on both the components of the presentation and its scientific merit. To be eligible the candidates must report work that has been performed under the auspices of the University of Otago.

(1) At the **August 2017** scientific meeting of the Otago Medical School Research Society (OMSRS) there were 10 **doctoral** candidates (selected from 35 applicants based on their submitted abstracts). The first Prize ($1,000) funded by Otago Postgraduate Medical Society was awarded to **Stella Cameron** (supervised by Dr Louise Parr-Brownlie, Department of Anatomy, and Professor Brian Hyland, Department of Physiology) on the topic of "**Pathophysiological and anatomical changes of the deep cerebellar nuclei in a chronic rat model of Parkinson's disease**". The second prize ($500), which was funded by the **OMRF**, was awarded to **Matthew Sykes** (supervised by Professor John Reynolds, Department of Anatomy) on the topic of "**Low-intensity magnetic stimulation and excitability in the rodent neocortex as measured by local field potentials**".

(2) At the **May 2018** scientific meeting of the OMSRS there were 10 candidates (selected from 27 applicants based on their submitted abstracts). All were **summer research scholars** and 2 of the 10 (and 6 of the 27) had been sponsored by the OMRF. The **first prize** ($500) funded by the **OMRF** was awarded to **Sophie Mathiesen** (supervised by Professor Cliff Abraham, Department of Psychology, & Dr Stephaine Hughes, Department of Biochemistry) on the topic of "**Assessing the efficacy of a novel adeno-associated viral capsid in targeting the brain**". The **second prize** ($250) funded by the **OMRF** was awarded to **Ashton Blake-Barlow** (supervised by Dr Sean Coffey, Department of Medicine, & Professor Greg Jones, Department of Surgical Sciences) on the topic of "**Aortic size index to predict risk in coronary artery disease patients**".

The OMRF summer research prizes since 2015 have been called *"The Pat Cragg Summer Scholar Speaker Prizes"* in recognition of the long-standing involvement by Associate Professor Pat Cragg in the summer research scholarship assessing committee.

OMRF-sponsored Invited Speaker for the Otago Medical School Research Society:

For the annual invited speaker meeting of the OMSRS (19 September 2017) there were **two** invited **local** speakers: **Professor Parry Guildford** (Department of Biochemistry and Director, Cancer Genetics Laboratory) on the topic of "**The cause of cancer**" and **Dr Chris Jackson** (Department of Medicine and Medical Director of the Cancer Society of New Zealand) on the topic of "**Keytruda in melanoma: from bench to bedside, via the steps of parliament**".

OMRF-sponsored prizes at the Otago School's Science Fair:

The Foundation sponsors four prizes ($50 each) each year in the Special Prize category at the **Otago Aurora Science & Technology Fair** for secondary schools for projects involving medically orientated topics. The **August 2017** recipients were "Gluten or Gluten-free, that is the question" by Belle King-Begg, St Hilda's Collegiate School (Year 8), "Arrrghhh that hurts" by Harvey Mullins, Dunedin North Intermediate (Year 8), "We got the beat" by Quilla Cashell-Smith, Fairfield Intermediate (Year 8) and "Putting your heart to the test" by Rosa Lines & Lucy Cowie, Columba College (Year 8). The Foundation's judges were Assoc Prof Greg Jones, Dr Andrew Bahn and Dr Lyn Wise.

ACKNOWLEDGEMENTS

The Foundation continues to play an ever increasing role in funding Medical Research in Otago – may we thank the Scientific Committee for its dedicated efforts in the arduous, though satisfying, work of assessing the scholarship and merit of the many summer research projects and grant applications that it receives. We thank the Council of the Foundation for the support, advice and enthusiasm with which our funding recommendations are endorsed and the many Benefactors and Sponsors of the Foundation whose financial support has made all this possible.

Associate Professor Patricia A. Cragg & Professor Gregory T. Jones

Outgoing & Incoming Chairs, OMRF Scientific Committee

30 June 2018

FINANCIAL HIGHLIGHTS

Otago Medical Research Foundation Inc.

Financial Highlights

Otago Medical Research Foundation Inc.

This summary financial report has been authorised for issue by the Chairperson of the Council Mr Ken Dempster on 3 July 2018. The results presented in the summary financial report have been extracted from the full financial report for the year ended 31 March 2018. As such, this summary report cannot be expected to provide as complete an understanding as provided by the statements of financial performance, financial position and movements in equity of the Otago Medical Research Foundation Incorporated. A full copy of the audited financial report for the Otago Medical Research Foundation Incorporated for the year ended 31 March 2018 is available from the office of the Foundations administrators - Deloitte, Otago House, 481 Moray Place, Dunedin.

Statement of Financial Performance

For the Year ended 31 March 2018

	2018 $	2017 $
Operating Income		
Donations, Bequests, Subscriptions	721,468	610,183
Investment Income	260,797	261,572
Profit (Loss) on Disposal of Investments	-	18,193
	982,265	**889,948**
Less Expenses		
Administration	112,968	90,270
Promotion Costs	348,824	334,857
Total Expenses	**461,792**	**425,127**
Net Surplus before Research Grants	**520,473**	**464,821**
Research Grants - Current year	361,271	475,524
Net Surplus for the year	**159,202**	**(10,703)**

Statement of Financial Position

As at 31 March 2018

	Market	2018 $	2017 $
Current Assets		428,686	157,012
Investments	5,763,922	5,031,366	5,221,685
Total Assets		5,460,052	5,378,697
Current Liabilities		360,865	438,712
Total Liabilities		360,865	438,712
NET ASSETS (EQUITY)		5,099,187	4,939,985

Statement of Movements in Equity

For the Year ended 31 March 2018

	2018 $	2017 $
Revenue		
Net Surplus	159,202	(10,703)
Total Recognised Revenues and Expenses	**159,202**	**(10,703)**
Equity at the Beginning of the Year	4,939,985	4,950,688
Equity at the End of the Year	**5,099,187**	**4,939,985**

Statement of Cash Flows

For the Year ended 31 March 2018

	2018 $	2017 $
Net Cash Flows from Operating Activities	116,120	1,255
Net Cash Flows from Investing Activities	186,870	(47,219)
Net Increase / (Decrease) in Cash Held	**302,990**	**(45,964)**
Cash at the Beginning of the Year	62,427	108,391
Cash at the End of the Year	**365,417**	**62,427**

Statement of Service Performance

For the Year ended 31 March 2018

The Foundation aims to establish world-class medical research for the benefit of local, national and international health.

The Foundation has provided a calendar of events in which members, supporters and the public were invited to participate - the Club lunches, annual dinnner, annual golf day, and various other one-off events.

Grants & Scholarships approved during the year:	2018 Number	2018 Actual ($)	2018 Budget ($)	2017 Number	2017 Actual ($)
Annual Grants	4	107,139	108,000	5	141,964
Special Fund Grants	10	223,280	220,000	11	247,727
Summer Research Scholarships	19	78,000	78,000	23	94,000
Otago Medical Research Society Award Sponsorship	1	1,000	1,000	-	-
Total	**34**	**$ 409,419**	**$ 407,000**	**39**	**$ 483,691**

The full financial report of the Otago Medical Research Foundation for the year to 31 March 2017 were authorised for issue by the Chairperson of the Council. The full financial statements applied Public Benefit entity reporting (not for profit) standards. The auditor expressed an unqualified opinion. The summary financial report has been examined by the auditor for consistency with the full financial report. The auditor has expressed an unqualified opinion.

AUDITOR'S REPORT

Crowe Horwath
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REPORT OF THE INDEPENDENT AUDITOR ON THE SUMMARY FINANCIAL STATEMENTS

To the Council of the Otago Medical Research Foundation

Opinion

The summary financial statements, which comprise the summary statement of financial position as at 31 March 2018, the summary statement of financial performance, summary statement of movements in equity, summary statement of cash flows, and summary statement of service performance for the year then ended are derived from the audited financial statements of Otago Medical Research Foundation (the "Society") for the year ended 31 March 2018.

In our opinion, the accompanying summary financial statements are consistent, in all material respects, with the audited financial statements, in accordance with FRS-43: *Summary Financial Statements* issued by the New Zealand Accounting Standards Board.

Summary Financial Statements

The summary financial statements do not contain all the disclosures required by Public Benefit Entity Simple Format Reporting – Accrual (Not-For-Profit). Reading the summary financial statements and the auditor's report thereon, therefore, is not a substitute for reading the audited financial statements and the auditor's report thereon. The summary financial statements and the audited financial statements do not reflect the effects of events that occurred subsequent to the date of our report on the audited financial statements.

Other Information

The Council are responsible for the other information. Our opinion on the summary financial statements does not cover the other information included in the annual report and we do not and will not express any form of assurance conclusion on the other information. At the time of our audit, there was no other information available to us.

In connection with our audit of the summary financial statements, if other information is included in the annual report, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the performance 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 our auditors' report, we concluded that there is a material misstatement of this other information, we are required to report that fact.

The Audited Financial Statements and Our Report Thereon

We expressed an unmodified audit opinion on the audited financial statements in our report dated 3 July 2018.

Crowe Horwath.
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Council's Responsibility for the Summary Financial Statements

The Council is responsible on behalf of the entity for the preparation of the summary financial statements in accordance with FRS-43: *Summary Financial Statements.*

Auditor's Responsibility

Our responsibility is to express an opinion on whether the summary financial statements are consistent, in all material respects, with the audited financial statements based on our procedures, which were conducted in accordance with International Standard on Auditing (New Zealand) (ISA (NZ)) 810 (Revised), *Engagements to Report on Summary Financial Statements.*

Other than in our capacity as auditor we have no relationship with, or interests in, the Society.

Crowe Horwath

Crowe Horwath New Zealand Audit Partnership

CHARTERED ACCOUNTANTS

Dated at Dunedin this 3rd day of July 2018

Otago Medical Research FOUNDATION

Annual Report to 31st March 2018 &
Notice of Annual General Meeting

Charities Number: CC33444

OMRF.ORG.NZ