Making News

A ‘biosensor mouse’ that can predict the spread of pancreatic cancer

Garvan’s Dr Paul Timpson and collaborators in the UK have created a “biosensor mouse”, enabling them to watch as pancreatic cancer cells begin to “unzip” from each other in real time. This “unzipping” is a signal that cells are on the verge of spreading from the primary tumour. Remarkably, the researchers successfully rezipped these cancer cells by treating mice with anti-cancer therapies, stopping the spread of cancer before it had begun. “We now have a model that is one step ahead of the invasion process in pancreatic cancer – but we are also already using this model in our laboratory for other aggressive and highly invasive cancer types, such as breast cancer. Ultimately, we expect to use the biosensor mouse to explore zipperings and cancer spread in a wide range of tumours throughout the body,” said Dr Timpson.

Taking a ‘diet holiday’ could improve weight loss

Researchers from Garvan and the University of Sydney may have good news for those who struggle to stick to their diet: taking a break from dieting won’t necessarily ruin your weight loss efforts, and it could actually improve them. In the study that was conducted in mice and published in the journal PLOS ONE, dieting was carried out for five to six days at a time, then interrupted by several days of unrestricted eating. The research found that taking a break from dieting could help weight loss by improving the efficiency of weight loss (the amount of weight lost for every kilojoule restricted).

How to wake a sleeping cancer cell – and why you might want to

Cancer cells that lie ‘snoozing’ in the skeleton can be awakened – or left to slumber on – by changes in the bone that surrounds them. In a world first, Garvan researchers have used state-of-the-art microscopy techniques to watch cancer cells sleep within living bone over a period of months. They show that cancer cells can be ‘woken up’ when bone tissue is broken down around them, suggesting new possibilities for treating metastatic cancer in bone. Garvan’s Professor Peter Croucher said, “This means we can think in a whole new way about treating bone metastasis. We could inhibit the breakdown of bone by osteoclasts so as to keep cancer cells in long-term hibernation. There are already drugs that do this, and have been shown to improve survival in breast cancer patients. The other, more radical, option is to do the opposite – to wake the sleeping cells by activating osteoclasts and driving the breakdown of bone. Most cancer treatments target active, dividing cells, so waking the sleeping cells should make them susceptible to those therapies – and, ultimately, could eradicate any residual disease.”
From the CEO

Dear Friends,

Last year you will have read about Garvan’s involvement in the establishment of the Pancreatic Cancer Alliance. Garvan, through its involvement in the International Cancer Genome Consortium, is recognised as a world leader in pancreatic cancer research and we have always strived to make sure that we engage with those people who are struck with this awful disease, their families and friends.

Under the Chairmanship of leading journalist Tracey Spicer (who is the patron of our pancreatic cancer program), Garvan was able to help bring the peak organisations working in this area in Australia together. The aim was simple – to collaborate, share and create a united voice.

It was a great honour for me to be in NSW Parliament House on 28 October last year when NSW Premier for Health, The Hon. Jillian Skinner, MP launched the new alliance that consists of Avenir Pancreatic Cancer Foundation, Cancer Australia, GI Cancer Institute, Pancare Foundation, PurpleOutWorld and Garvan.

This year we aim to build on this vital alliance and, as such, I would be delighted to hear from any of Garvan’s supporters who are planning activities to raise awareness about pancreatic cancer throughout the year, so we can include them in the program of events. If you are planning an event, please send me a message at a.giles@garvan.org.au.

In a similar vein, this year we are building a new collaboration in the field of osteoporosis – again building on Garvan’s landmark research. A key aspect of this work will involve both school and GP education programs.

I highlight both these initiatives because we are planning the way the world thinks about the biology of osteoporosis, and our knowledge of the impacts of the disease and its treatment. Just some of the breakthroughs resulting from DOES include:

• Osteoporosis is not just a disease of elderly women. Once men over the age of 60 have had a fracture, the risk of a second fracture increases three to four fold, diminishing any risk protection males might have had prior to the fracture. While for women, the risk of a second fracture doubles.
• Any osteoporotic fracture in a person over the age of 60 years increases that person’s risk of dying prematurely, even after a relatively minor fracture. More critically, with hip fractures, there is double the risk of death for women, and three times the risk for men.
• Identifying a remarkable benefit of osteoporosis treatment. People taking bisphosphonates are not only surviving well better than people without osteoporosis, they appear to be gaining an extra five years of life.
• The Garvan Fracture Risk Calculator was developed using data collected by DOES. This tool has the potential to allow individuals to make informed judgments about their individual risk of having an osteoporotic fracture and what they might do to reduce that risk.

For further information about DOES or any aspect of Garvan’s bone biology research, visit www.garvan.org.au/research/bone-biology

Key research findings from Dubbo bone study

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How a business transaction lead to passionate support of Garvan’s work

When Clare Greaves was head of Human Resources for a major financial institution, she helped to establish a Workplace Giving program with the Garvan Institute. At that point, there was no way Clare could have known just how involved with Garvan she would become.

At the time, Clare was impressed by Garvan, and particularly the people. “They were so passionate and involved, which made them very easy to work with from the bank’s point of view,” said Clare.

So, when Clare retired from the bank, she was concerned about how she would spend her time. “Retirement was a huge step for me. I’d been with the bank for so many years that the thought of leaving and what I would do was a bit overwhelming.”

“Then I thought, ‘I know! I’ll go and volunteer with Garvan.’” After taking a holiday and waiting a few months, some project work became available in Garvan’s HR department, so I did that for about 12 months. It started being only once a month, but quickly became once a fortnight, then once a week. Even I did a head of Garvan’s HR for a short time, while recruitment for a new head took place. Eventually I started volunteering with the Garvan Research Foundation, the fundraising arm of the Institute, and that’s where I’ve been ever since.

“I now volunteer with the Foundation once a week, doing mainly administration work – putting information into envelopes, opening mail, entering relevant details on the receipts for donations. It’s nice – the people are so nice, and it keeps your mind active. If I don’t come in, I really miss it.”

By the time Clare was preparing her will, she was very passionate about giving back to the community. She was deciding who to leave a bequest to, so she said, “I didn’t even think about anybody else.”

As a Partner for the Future, Clare has not specified a particular disease area that will benefit from her bequest. She hopes it will be used for the area of greatest need at the time. She says, “That’s the great thing about Garvan – the work is so diverse, across so many disease areas that no matter where the money is used, you know it is going to help make a real difference.

“If someone is considering leaving a gift in their will, I would say, ‘do it!’ It doesn’t have to be everything. Every little bit counts. By supporting medical research, you are leaving a gift to future generations of your family, and others as well.”

Clare summarised her feelings about Garvan by saying, “I think Garvan is a wonderful organisation. From what I’ve seen, from a number of different perspectives, it really is. If I had my life again, I’d spend less time in the corporate world, and more time working in an organisation such as Garvan.”

If you would like information about giving to Garvan in your will or volunteering, please contact Carol O’Carroll on 02 9295 8117.

The inaugural Ridley Ken Davies Award winners announced

The inaugural Ridley Ken Davies Award was recently presented to Garvan’s Dr Yvonne Selecki and Dr Mohammad Ali Moni. The award of $50,000, made by Garvan’s partner Ridley, in memory of Mr Ken Davies. Ridley is the country’s largest commercial provider of high performance animal nutrition solutions.

Ken Davies, a Ridley employee of six years, sadly passed away in 2015, having lived with and been treated for cancer for a number of years. The Ridley Ken Davies Award is an investment in the future of scientists to deliver breakthrough medical research.

It aims to support a research project that uses data obtained through Garvan’s Dubbo Osteoporosis Epidemiological Study (DOES), the world’s longest-running large-scale epidemiological study of osteoporotic fractures in men and women.

The project submitted by Drs Selecki and Moni will look at developing a web-based data portal, allowing researchers in fields other than osteoporosis to access the valuable data generated by DOES. Congratulations to the recipients of the Ridley Ken Davies Award, and thank you to Ridley for its ongoing support.

DreamLab has outstanding impact on research time

Launched in November 2015 with the Vodafone Foundation, the DreamLab app allows users to donate their smartphone data to improve medical research. By unlocking the processing power of mobile devices, the app effectively turns smartphones into powerful research tools. The app allows users to donate their unused, disconnected smartphone data to Garvan.

The DreamLab app connects to Garvan’s DreamLab server via the Amazon cloud – like a giant crossword puzzle, with thousands of DreamLab users solving the puzzle together. Each user is a solve, and the puzzle is的成长.

DreamLab works by pooling the processing power of Australian mobile devices to create the nation’s first smartphone supercomputer for cancer research. While a smartphone is plugged in and charging, the DreamLab app automatically downloads and solves a small cancer research problem, and then sends the result back to Garvan researchers via the Amazon cloud. The current version of DreamLab, on android devices, can be downloaded in seconds, and is suitable for any android smartphone.

Five months since its launch, the DreamLab app has been downloaded more than 80,000 devices, which means our research has been running at 1,500 times faster than we could manage without DreamLab’s help. We are hoping to reach 100,000 downloads so, if you have an Android phone (DreamLab is currently available for Android use only), get on board and share your excess data. It takes just a click of a button, and for $0.01 worth of data, you can help speed up Garvan’s cancer research.

For more information about the DreamLab app, visit www.vodafone.com.au/dreamlab

www.garvan.org.au
Your support helps ‘Hedgehog’ research progress
towards vital treatment for triple negative breast cancer

Scientists know that breast cancer is not just one disease, but a number of different cancers – potentially up to five or more – with different molecular causes and outcomes for patients. Triple negative breast cancer is a highly aggressive form of the disease. It does not produce any of the three receptors – oestrogen, progesterone or HER2 – which are targets for the drugs Tamoxifen and Herceptin®, often effective in treating other forms of breast cancer. As such, triple negative breast cancer patients do not respond to receptor targeted treatments and chemotherapy remains their only drug option. Therefore, finding an effective drug target is a very high priority.

**Blocking ‘Hedgehog’ could slow tumour growth**

In 2011, Garvan researchers Clinical Associate Professor Sandra O’Toole and Dr Alex Swarbrick made a very significant breakthrough in understanding how breast cancer cells interact with nearby healthy cells to support them. A molecule known as ‘Hedgehog’, which is normally only active during embryonic development, is reactivated in triple negative breast cancer, even in the early stages of the disease. Hedgehog was found to be at the centre of a cellular ‘switchboard’, transmitting malignant biochemical messages between cancer cells and the surrounding healthy cells.

Dr Swarbrick’s team successfully created a mouse strain to use as a model for triple negative breast cancer. They were looking to see if the administration of an antibody against Hedgehog would block its harmful action. The results of these experiments were extremely positive. The tumours in the mice given the antibody were 1/3rd the size of the tumours in the control group. In other words, the antibody slowed the rate of cell division and tumour growth.

In addition, there was a significantly reduced rate of metastasis (the spread of the cancer to other parts of the body). Triple negative breast cancer typically metastasises to the brain, lungs and liver. There was no liver metastasis and reduced lung metastasis in the treated group.

These were exciting discoveries as high levels of Hedgehog are associated with increasing aggressiveness and progression of breast cancers. Importantly, drugs that silence Hedgehog are already approved for the treatment of patients with skin and brain cancers. With more research and a better understanding of ‘Hedgehog signalling’ in breast cancer, it may ultimately be possible to use these anti-Hedgehog drugs to stop breast tumours from growing and spreading. Since 2011, work has continued, and here we look at how far the research has progressed, and what’s next for this promising project.

**Promising progress**

At the time of the initial discovery, Dr Swarbrick realised that more fundamental research was needed to fully explore the potential of the Hedgehog signalling pathway as a new drug target in metastatic triple negative breast cancer. This additional research was essential to discover the best way to block this lethal communication pathway, and to translate the discoveries to clinical trials for anti-Hedgehog drugs in breast cancer. Dr Swarbrick and his team have continued working to gain a better understanding of the mechanisms by which Hedgehog works, and he says the team has now gained remarkable insights into how malignant cancer cells communicate with nearby healthy cells within the tumour.

Dr Swarbrick explains, “The Hedgehog molecule, secreted by the breast cancer cells, signals to a particular cell type known as a cancer-associated fibroblast, within the surrounding tissue. This signal tells the fibroblast to provide a local environment that promotes the breast cancer cells to grow and evade therapy. The cancer associated fibroblasts achieve this by secreting several molecules that stimulate the aggressive behaviour of the cancer cells.”

**Progress to clinical trials**

“Based on the discovery of the details of this crosstalk between the cancer and the healthy cells, we undertook ‘preclinical trials’ of anti-Hedgehog drugs in concert with standard-of-care chemotherapy,” says Dr Swarbrick. “In mouse models, this combination succeeded in blocking this malignant communication, subduing the tumour growth and spread. The results were far superior to treatment with chemotherapy alone.”

The results are so promising, they have now progressed to clinical trial. Garvan is collaborating with the esteemed Spanish Breast Cancer Trials Group, led by MD PhD Miguel Martin, where a Phase I Clinical Trial of this combined therapy is now in progress.

**What’s next?**

While clinical trials continue in collaboration with Garvan, the technology developed by Dr Swarbrick’s team for this project opens up a number of opportunities for future research. Dr Swarbrick says, “Just as every human being in a crowd is unique, cancer cells also have unique molecular signatures. We now think of tumours as ecosystems, and being able to analyse the uniqueness of each cell opens many research doors in oncology. We now have the valuable expertise and skill set to study both the cancer cell and its tumour microenvironment, and how complex communication between various cell types supports metastatic spread and drug resistance.”

**Philanthropic support**

The Hedgehog project would not have reached this promising stage, or been eligible for the subsequent National Health and Medical Research Council funding it received, without your support and the philanthropic investment of several individuals who have conducted excellent original research that has been recognised internationally. They would also often have demonstrated academic leadership.

Thank you to the generous supporters, like Joe Fischer who recently celebrated a special occasion and requested that family and friends make a donation to Garvan in lieu of gifts.

Thank you Joe!
Can you give us a brief outline of your recent work history?
I am a clinical psychologist with a PhD in psychology. After completing my studies in New Zealand, I moved to Sydney to work in the School of Psychiatry at UNSW as a Research Fellow. This proved to be an excellent opportunity to teach and supervise postgraduate research students as well as conduct research about mental health and wellbeing.

Several years ago I became interested in student wellbeing and student programs that foster achievement. I gained experience in the area while working at Australian Catholic University in the Faculty of Health Sciences. I am delighted to now join Garvan as the Student Programs Coordinator.

What is the current focus of your work?
I'm very interested in the immune system and primary immunodeficiencies, in particular, CD4+ T cells. They play an important role in regulating immune responses to pathogens and tumour cells, and in orchestrating overall immune responses. We have lots of different types of CD4+ T cells that each play important and specific roles during a particular infection.

What is the biggest challenge in your area of research?
I take information from real patients with real diseases, and try to figure out what is happening to their immune system. I study CD4+ T cells, as well as the other immune cells to determine how a mutation in a single gene results in disease susceptibility. Ultimately, my aim is to find ways to deliver better and more effective treatments.

What do you enjoy doing in your spare time?
I love reading to my children (aged four and six years) every night. Much of the pleasure comes from addressing the often humorous questions and observations that children make. I enjoy shopping and spending time outdoors.
In Memoriam November 2015 to January 2016
Donations have been made in memory of:

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Louisa Armstrong
Bob & Margaret Auld
Aydn
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Tony Bingham
John Birmingham
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Philip G Ward
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Anne Willis
Pamela Wilson
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Cyril P Wong

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Clinical Studies

Ovarian cancer study

We are looking for volunteers with NO personal history of cancer to donate approximately 50-80 mL of blood to be used to optimise experimental protocols and/or biobanked for future use in cancer vs controls comparisons. This work is part of a project aimed at developing a blood-based test for early ovarian cancer. To volunteer, or for more information, contact Dr Kristina Warton 0438 649 073 or email k.warton@garvan.org.au (St Vincent’s HREC Ref SVH14/257).

Brown fat and blood pressure study

Brown fat is a special kind of fat which burns fat in the body. We are looking for volunteers who have high blood pressure to participate in a trial investigating the effect of a medication on brown fat. Participants must be aged 18 to 45 years and currently on one blood pressure medication. For further information please contact Dr Paul Lee (02) 9295 8416 or email p.lee@garvan.org.au (St Vincent’s HREC Ref 14/SVH/105).

Impact of medication on ability to process a meal

Volunteers are needed for a study testing an approved medication on your body's ability to process a meal. We are looking for healthy men and women, aged 22-65 years. The study involves one short (one hour), and two longer (four hours each) morning visits to the Garvan Institute in Darlinghurst. Participants will be provided breakfast and reimbursed for travel and time. For further information, please call (02) 9295 8215 or email crf@garvan.org.au (St Vincent’s HREC Ref 14/157).

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Donations of $2 and above are tax deductible.

Please use this coupon if you would like to make a donation to Garvan’s breakthrough medical research, or if you would like further information. We would love to hear from you.

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Coming Up

2016 free public seminars

Wednesday 20 April – 10am – Pancreatic, ovarian and rare and neglected cancers

Wednesday 14 September – 6pm – Genomics and the revolution in medical research

Friday 28 October – 10am – Immune disorders

Space at these free public seminars is limited, so bookings are essential. To book, phone 1300 73 66 77 or (02) 9295 8110 during business hours, or visit www.garvan.org.au

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