mimr-phi institute

MIMR-PHI Institute has been renamed Hudson Institute of Medical Research

HUDSON INSTITUTE OF MEDICAL RESEARCH

news

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HUDSON INSTITUTE OF MEDICAL RESEARCH

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DIRECTOR'S MESSAGE

"I am very pleased to announce that as of 14 May, the Institute will be named Hudson Institute of Medical Research. This name was chosen to honour the late Professor Bryan Hudson, a world-class medical researcher who was instrumental to the early origins of both of the Institute's founding partners, MIMR and PHI."

Since Prince Henry's Institute (PHI) and the Monash Institute of Medical Research (MIMR) joined forces in January 2014, we have been known by the interim name 'MIMR-PHI Institute', which allowed time to establish the vision and strategy for the organisation. We have been working closely with our staff to identify a new name and branding identity for the Institute to reflect this vision.

I am very pleased to announce that as of 14 May, the Institute will be named Hudson Institute of Medical Research. This name was chosen to honour the late Professor Bryan Hudson, who was instrumental to the early origins of both PHI and MIMR. As a world-class medical researcher and educational leader, he was a respected mentor to the early founders of both organisations. Professor Hudson was Chair of the Monash University Department of Medicine and Founder of Prince Henry's Institute. His legacy exemplifies the values to which the Institute aspires. An article about Professor Hudson's esteemed career can be found within this newsletter.

I would like to thank you for responses to last year's donor survey. Your feedback is invaluable at this crucial stage in the Institute's history, as we plan for the next five years and review how we allocate our resources and communicate our research with our supporters. I was very pleased to hear that so many of you care deeply about the Institute's research. You asked for more cancer stories and to support specific research projects, and we will endeavour to ensure that we bring you the most relevant information to best meet your needs. We will now be able to find more people like you who are motivated to support medical research.

I would also like to acknowledge three of the Institute's leaders who have recently been awarded high honours. Professor Euan Wallace, co-head of The Ritchie

Centre, has been awarded a fellowship of the Australian Academy of Health and Medical Sciences, a council established in 2014 by leading health experts to provide independent advice to government, industry and the

community on medical practice and research. Professors John Funder and Peter

Fuller received 2015 Australia Day honours. Professor Fuller, Associate Director of the Institute and Head of its Centre for Endocrinology and Metabolism, has been recognised with an AM for significant service to medicine as an endocrinologist, through contributions to medical research. Professor Funder, a Distinguished Scientist of the Institute, was awarded an AC for eminent service to medicine, particularly to cardiovascular endocrinology, as a renowned researcher, author and educator, to the development of academic health science centres.

^ MIMR-PHI's Professor Terry Johns has received $2.8M from the Cure Brain Cancer Foundation in support of the Brain Cancer Discovery Collaborative (BCDC).

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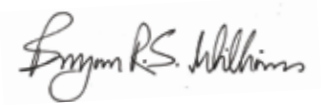
Front cover photo: MHTP Translation Research Facility, due for completion in October 2015.

The Federal Government's annual National Health and Medical Research Council (NHMRC) funding distribution was announced in late 2014. The Institute performed very well, despite a drop in project grant funding to just 14.9 per cent of applications, the lowest in our history. The Institute ranked third among all independent medical research institutes in project grants awarded. Deputy Head of The Ritchie Centre, Associate Professor Caroline Gargett, has received significant funding for her project focusing on the clinical translation of a cell-based therapy for pelvic organ prolapse. Associate Professor Tim Moss was awarded a grant supporting his project 'Human amnion epithelial cell therapy for bronchopulmonary dysplasia'. You can review all our successful grants in this story.

Additionally, the Institute's outstanding research has been rewarded with three grants from the Cancer Council Victoria, as well as funding from the National Heart Foundation, US Department of Defense, Cerebral Palsy Alliance and the Victorian Cancer Agency. The Cure Brain Cancer Foundation has provided Professor Terry Johns with a further $2.8 million, which will transform the translational research in his Brain Cancer Discovery Collaborative. This funding solidifies our position as one of Melbourne's top medical research institutes.



Professor Bryan Williams
Institute Director

NATIONAL HEALTH & MEDICAL RESEARCH COUNCIL - PROJECT GRANTS

Ashley Mansell and Julie McAuley: "PB1-F2 is critical to Influenza A virus pathogenicity through activation of the inflammasome"

Brendan Jenkins, Gary Anderson and Stefan Rose-John: "The molecular basis by which the interleukin-6 cytokine promotes emphysema"

Caroline Gargett and James Deane: "Progenitor origin and regulation in endometrial regeneration"

Caroline Gargett, Jerome Werkmeister, John Arkwright and Anna Rosamilia: "Towards clinical translation of a cell-based therapy for pelvic organ prolapse"

Craig Harrison, Paul Gregorevic, David Roberston and Matthew Gillespie: "Physiological consequences of the loss of inhibin activity"

Flora Wong, Rosemary Horne and Stephanie Yiallourou: "In what position should we be sleeping preterm infants in the NICU?"

Graeme Polglase, Suzanne Miller, Arvind Sehgal, Beth Allison and Atul Malhotra: "Reducing morbidities in preterm growth restricted neonates"

John Hirst (The University of Newcastle) and David Walker: "Perinatal stress leads to neurosteroid deficits and adverse behavioural outcomes"

Julian Rood (Monash University) and Paul Hertzog: "Host-pathogen interactions in clostridial myonecrosis"

Karla Hutt and Richard Anderson: "The role of Bid in apoptosis within the ovary"

Katherine Loveland and Patrick Western: "Activin control of the male germline for reproductive health"

Michael Gantier and Richard Ferrero: "Defining a role for TLR7/8 in Helicobacter pylori infection"

Paul Gregorevic (Baker IDI), Craig Harrison and David de Kretser: "Targeting activin to combat life threatening cancer cachexia"

Paul Hertzog and Timothy Ravasi: "Regulatory systems in the innate immune response"

Rebecca Lim, Euan Wallace, Daniel Chambers and James Pearson: "Bronchopulmonary dysplasia – a regenerative medicine approach"

Richard Ferrero and Ivo Boneca: "NOD1 sensing of H. pylori peptidoglycan promotes cell survival and bacterial persistence"

Suzanne Miller, Graham Jenkin and Michael Fahey: "Cord blood stem cells for cerebral palsy"

Timothy Moss, Rebecca Lim, Graeme Polglase and Jane Pillow: "Human amnion epithelial cell therapy for bronchopulmonary dysplasia"

RESEARCH AND CAREER FELLOWSHIPS

Alison West: "Toll-like receptor 2 signalling as a potential therapeutic target in gastric cancer"

Katherine Loveland: "Developmental switches in spermatogenesis"

Richard Ferrero: "Dissecting the role of NOD-like receptors (NLRs) in Helicobacter pylori disease"

Samuel Forster: "Integrated system wide characterization of microbiota and host factors influencing intestinal colonization resistance to the healthcare pathogen Clostridium difficile"

POST GRADUATE RESEARCH FELLOWSHIPS

Moya Vandeleur: "The impact of sleep disturbance on daytime functioning, mood and quality of life in children and adolescents with cystic fibrosis"

Yao Wang: "HtrA4-induced endothelial dysfunction in early-onset preeclampsia"

NEW INSTITUTE NAME
HONOURS THE LATE BRYAN HUDSON

MIMR-PHI Institute has been renamed 'Hudson Institute of Medical Research' to honour the late Professor Bryan Hudson, and to recognise the shared histories of its two founding partners, the Monash Institute of Medical Research (MIMR) and Prince Henry's Institute (PHI).

Hudson Institute Director, Professor Bryan Williams says Bryan Hudson was instrumental to the early origins of both MIMR and PHI. He was the first Professor of Medicine at Monash University and the Founding Chair of the University's Department of Medicine, MIMR's home until 2014. He was also appointed as Founding Director of Prince Henry's Hospital Medical Research Centre (MRC, subsequently Prince Henry's Institute). As Foundation Professor of Medicine, he established Prince Henry's Hospital as a key Monash University academic teaching hospital, with the first Monash MBBS medical cohort of 29 students graduating in 1966.

"Bryan Hudson has been widely touted as a world-class medical researcher and a revolutionary leader. Professor Hudson's legacy exemplifies the values to which the Institute aspires – excellence in cutting-edge research and ensuring its direct impact on the community," said Professor Williams.

He was a respected mentor to some of the early founders of MIMR and PHI. He recruited key medical and scientific staff, integral to the histories of the two Institutes, including: Professor Henry Burger, Director of MRC/PHI (1969-1998); Professors David de Kretser and Alan Trounson, founders of the Monash Institute of Reproduction and Development (subsequently MIMR); and respected respiratory physician, the late Associate Professor Blair Ritchie, who was involved in the establishment of what is now The Ritchie Centre, one of the Institute's six research-themed Centres.

He was also an internationally renowned endocrinologist; serving as the President of the International Endocrine Society (1980-1984) and becoming President of the Royal Australasian College of Physicians (1982-1984).

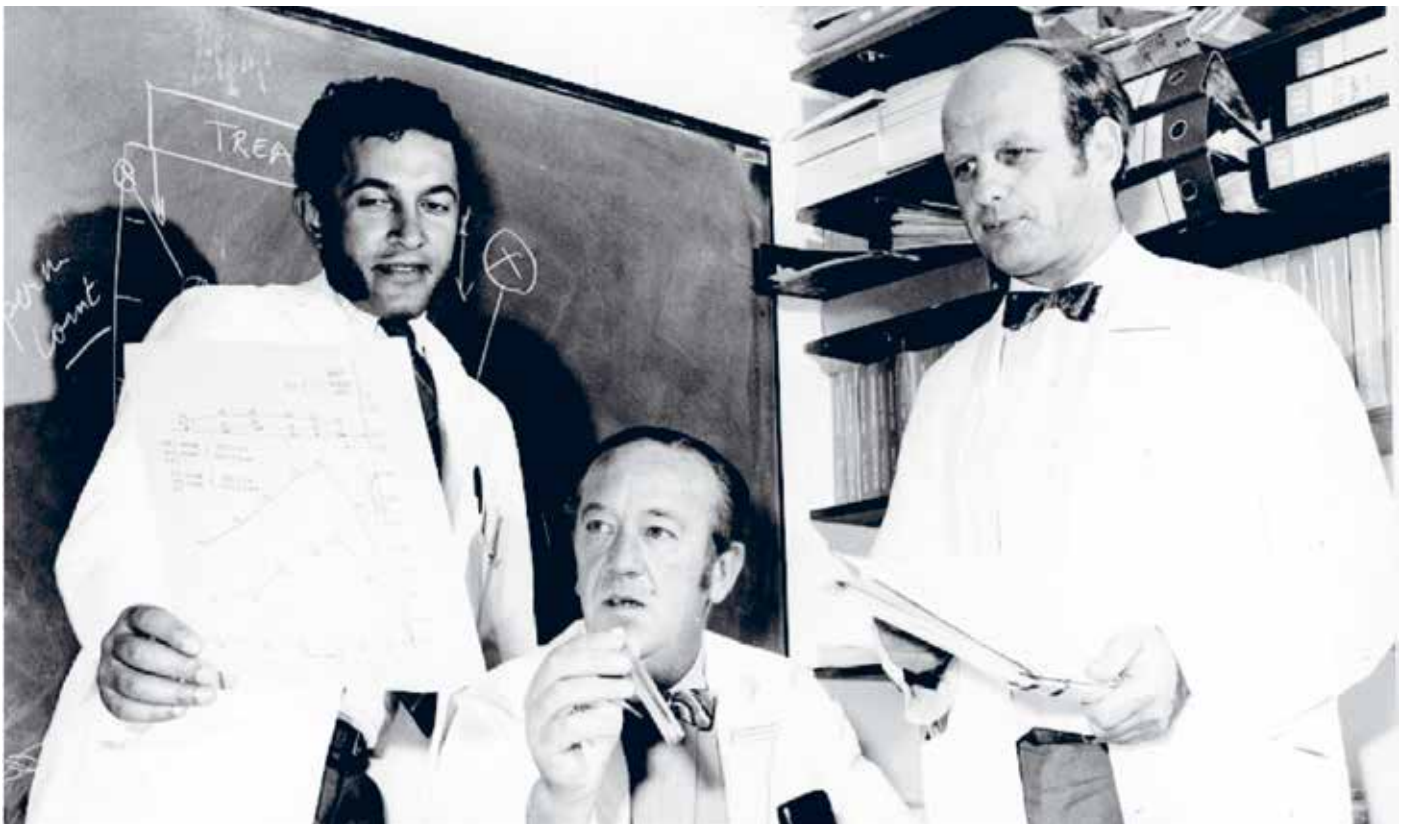
Hudson was a key member of a World Health Organisation Task Force exploring the possibilities of a reversible male steroid contraceptive. Together with Professors David de Kretser, Henry Burger, Jock Findlay and Carl Wood, he was instrumental in obtaining a major grant from the Ford Foundation.

Beginning with the Ford Foundation grant, Trounson and Wood developed the methods for IVF that have resulted in more than seven million babies born worldwide. Trounson went on to lead the team that discovered human embryonic stem cells and to pioneer their applications in human medicine. Hudson eventually went on to join the company founded by Trounson and Wood, Monash IVF, as the Chief Scientific Officer. Trounson says that the team worked closely through the wise leadership of Hudson.

"Bryan was a gruff, demanding scientist, but he had a soft and supportive core that made you want to perform well. His mentoring brought out the best in all of us," said Professor Trounson.

Hudson was a key driver in the ground-breaking search for inhibin, a hormone that inhibits the production of follicle-stimulating hormone

"Bryan Hudson was a world-class medical researcher and a visionary leader. His legacy exemplifies the values to which the Institute aspires - excellence in cutting edge research and ensuring its direct impact on the community" said Professor Williams.



^ L - R: David de Kretser, Bryan Hudson and Henry Burger

and prevents overproduction of eggs and sperm. The team gathered evidence supporting its existence and presence in testicular extracts. Inhibin was finally isolated and characterised by a group led by Burger and de Kretser. The discovery has had major implications in endocrinology and reproductive biology. Its measurement has led to a test to determine whether a woman is carrying a fetus with Down Syndrome (as inhibin-A is elevated in their blood serum) and our ability to diagnose and monitor one type of ovarian cancer.

Professor Burger, Hudson's long-time friend and colleague, says Hudson also worked with Professor John Coghlan at the Howard Florey Institute to establish methods for measuring the major male sex hormone testosterone, and other related hormones.

"These methods provided the basis for a renaissance in androgen physiology in which he was an acknowledged international authority for many years".

Professor Peter Fuller, now Associate Director of the Hudson Institute, worked closely with Professor Hudson in the Endocrinology Clinic at Prince Henry's Hospital and says Hudson was an excellent teacher and researcher.

"Bryan was a brilliant leader, innovator, visionary and an iconoclast. My hope is that our Institute's vision, in his image, will attract and nurture more researchers of his calibre who will go on to impact the fields of medicine and science the way he did".

Do certain contraceptives increase HIV susceptibility?

The Hudson Institute has received $1M AUD from the Bill & Melinda Gates Foundation to investigate the relationship between some oral contraceptives and an increased susceptibility to sexually transmitted infections (STIs), including HIV.

In 2013, a team of researchers at the Hudson Institute's Centre for Innate Immunity and Infectious Diseases, led by Centre Head Professor Paul Hertzog, characterised an important, naturally occurring immune cytokine in the female reproductive tract, which regulates immunity to sexually transmitted infections.

They had previously discovered and named it Interferon Epsilon (IFN-epsilon). This world-first discovery was published in the prestigious journal Science and it has many implications for future studies into the prevention of diseases of the female reproductive tract, including STIs.

Progesterone-based contraceptives have been linked to an increased susceptibility to STIs, which Professor Hertzog hypothesises is caused by progesterone suppressing the expression of IFN-epsilon in the female reproductive tract, rendering women taking progesterone-containing contraceptives more susceptible to infections.

"Certain progesterone-based contraceptive formulations are among the cheapest, most widely used contraceptives globally. Our study is the first of its kind aimed at characterising how progesterone is linked to suppressing IFN-epsilon expression. If we can achieve this, then we can investigate potential solutions and potentially contribute to the reduction of the high global incidence of HIV infection," said Professor Hertzog.

In recent years, the Gates Foundation has initiated a strong program of family-planning activities, which has included a significant investment in making contraceptives available to 220 million women in western Africa, India and Indonesia.

Providing women in developing countries with hormone-based contraceptives is aimed at helping mothers plan their pregnancies and reduce high infant mortality rates. If progesterone-based contraceptives are linked to increased HIV susceptibility, however, then alternative contraceptive options need to be considered. For this reason, the Gates Foundation has funded Professor Hertzog's study as a step to determining the most safe and effective contraceptive solutions for women globally.

To do this, Professor Hertzog will lead a team of international research collaborators, including scientist Professor Sam Mesiano from Case Western Reserve University and clinician-researcher Professor Sharon Achilles from the University of Pittsburgh, to conduct a comprehensive 18-month investigation into the mechanism behind progesterone regulation of IFN-epsilon and the identification of biomarkers for monitoring IFN-epsilon activity in women. The team will use a diversity of patient samples to screen for selective progesterone receptor modulators (SPRMs) to determine if they can maintain contraceptive efficacy without repressing IFN-epsilon expression.

Currently more than 33 million people are living with HIV and, while huge progress has been made in increasing access to HIV treatment in the past decade, the pandemic continues to outpace efforts to control it, with the number of newly infected people each year outnumbering those who gain access to treatment by two to one. Children are being born with HIV at a rate of 300,000 per year and half of them won't reach their second birthday.

IVF PIONEER RETURNS TO THE INSTITUTE WHERE IT ALL BEGAN

IVF pioneer, **Professor Alan Trounson** has returned to Australia to re-join the Institute he founded with Professor David de Kretser, now known as the Hudson Institute of Medical Research.

Professor Trounson, a world-leading stem cell scientist best known for the successful development of human IVF with Professor Carl Wood in 1977, has made major contributions to the reproductive field. This includes increasing our understanding of genes regulating early development and improved methods of conception, identification of genetic mutations in embryos as a new diagnostic technique (known as pre-implantation genetic diagnosis), the use of a fertility drug to induce multiple ova, and the freezing of embryos for future use.
These procedures have enabled more than 5 million women worldwide to conceive successfully through IVF and related technologies.

In 1991 Professor Trounson merged his research Centre with the research of Professor de Kretser's male reproductive physiology group to form the Monash Institute of Reproduction and Development, now the Hudson Institute.
In his new role as a Distinguished Scientist of the Institute, Professor Trounson will mentor the development of an active research program in the area of translational cell therapy research.

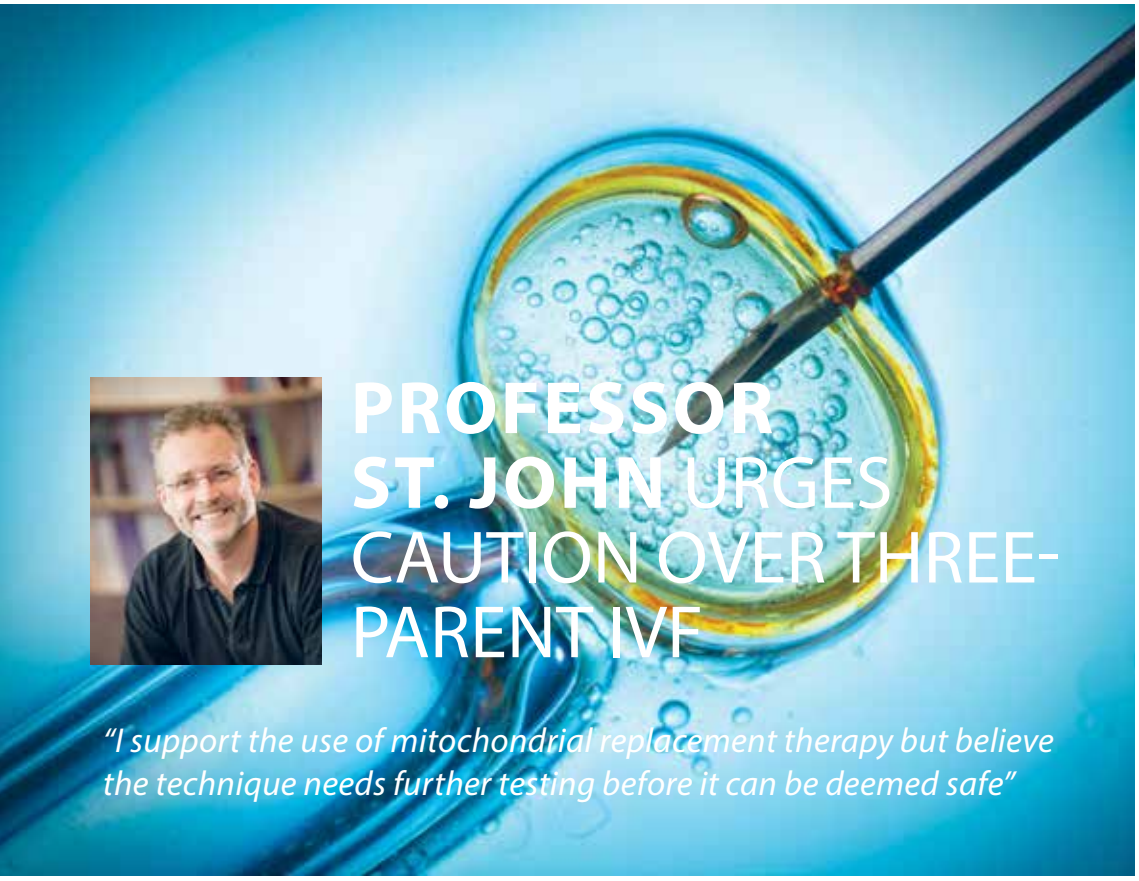
"I also hope to participate in the development of the Cell Therapies Platform as this translational platform becomes established in the new, Federally-funded, $84 million Translational Research Facility currently being constructed on the site," Professor Trounson said.

He returns to the Institute from the $3 billion California Institute for Regenerative Medicine (CIRM), where he spent the last 6 years driving stem cell research and translation studies. He joined CIRM after serving as Professor of Stem Cell Sciences, Founding Director of the Monash Immunology and Stem Cell Laboratories at Monash University, and was the Founder of the Australian Stem Cell Centre.

In 2000 Professor Trounson and his colleagues confirmed the discovery of human embryonic stem cells and showed that fully functional nerve and other types of progenitor cells could be derived from these cells, which led to a dramatic increase in interest in the potential of pluripotent stem cells to treat a range of previously incurable diseases.

Hudson Institute Director, Professor Bryan Williams says Professor Trounson will bring a great wealth of knowledge and outstanding leadership capabilities to the Institute.

"We are honoured and very pleased to have such a highly regarded scientist and a vital piece of our history back at the Institute," he said.



PROFESSOR ST. JOHN URGES CAUTION OVER THREE-PARENT IVF

"I support the use of mitochondrial replacement therapy but believe the technique needs further testing before it can be deemed safe"

Professor Justin St. John, Head of the Centre for Genetic Diseases at the Hudson Institute, has played a key role in the debate over the UK's recent decision to become the first country in the world to allow the controversial 'Mitochondrial Replacement Therapy' technique, which has taken on the name 'three-parent IVF'.

Babies that result from the technique — which uses a donated egg from a third party to cut out the risk of certain genetic disorders that the mother might pass on — can only attribute around 0.1 per cent of their DNA to the third party. The donors provide only their mitochondria, which are the 'power plants' of the cell, converting food into energy to power a cell.

When someone's mitochondria do not function properly, it can cause many life-threatening problems.

Professor St. John has been a mitochondria researcher for 20 years and, while he supports the technique, he has voiced his concerns that this decision may have come too early as he believes further testing is required to confirm its safety.

"I support the use of the mitochondria replacement technologies and I believe that these will become very useful technologies to prevent the inheritance of mitochondrial disease. However, before the technique is used to produce children, I think there should be additional testing carried out," he said.

"The reason for this is that the defective mitochondrial DNA can be carried over into the donor egg and, if it persists in the early embryo, it can be inherited by the children. This is something that we need to eradicate to ensure the very dangers we're trying to avoid are not still passed on to the child".

"By using large animal models where gestation is longer and more similar to the human, we will be able to determine the real effects of mitochondrial DNA carry over. This needs to be undertaken with sufficient animals to ensure that the data can be tested with rigorous statistical methods. Until we have this information, we should proceed with caution". ■

SUCCESS IN THE FIGHT AGAINST DEADLY INFLAMMATION

Inflammation is an important response to infection or injury but, if not carefully controlled, too much inflammation can cause serious diseases.

Hudson Institute Director and inflammation expert, Professor Bryan Williams says that, for many Institute researchers, a better understanding of the causes of excessive inflammation overproduction and how to bring it back under control is a priority as this will ultimately reduce the incidence of a whole host of diseases including myocardial infarction, stroke, cancer, diabetes, heart disease, and Crohn's and Alzheimer's diseases.

"Inflammation is at the root of so many diseases that you will find Hudson researchers from all six of our research-themed centres investigating this highly dangerous activity," Professor Williams said.

Paediatric clinician and researcher, Associate Professor Marcel Nold, says that rampant inflammation is harmful and leads to tissue damage, resulting in many side effects including pain, fatigue, and even organ failure and death.

"The current drugs that treat inflammation have proved limited in many situations, but and a better understanding of what keeps the process under control in the body could improve both the development of new therapies and existing treatments," he said. >

OVERRIDING THE BODY'S INFLAMMATORY RESPONSE

Husband-and-wife research team, Associate Professor Marcel Nold and Dr Claudia Nold from the Hudson Institute's Ritchie Centre, have discovered the mechanism of a protein that suppresses inflammation in the body, and say the information could be used to develop new drugs to control inflammation.

The international study led by them focused on interleukin 37 (IL-37), a powerful inhibitor of inflammation that is generated by the body.

Claudia and Marcel Nold

Previous research by the same team identified that IL-37, one of the rare anti-inflammatory mediators, acts much more broadly than others to regulate the immune response and protect the body from damage.

The new study, published in Nature Immunology, deciphers the mechanisms of how the body uses IL-37 as a molecular signal to regulate and control inflammation. The team found that to achieve its protective effects, IL-37 utilises a set pair of very specific receptors on target cells. By binding to these receptors, IL-37 instructs those target cells to execute a cascade of events, which temper several of the molecular pathways by which the body mounts inflammatory responses.

Dr Claudia Nold said the study is universally applicable to all types of inflammation in patients of all ages, in conditions ranging from the common cold to serious life-threatening illnesses.

"IL-37 is able to override the body's own destructive responses to injury and disease, harnessing its fundamental mechanisms of action," she said.

To unravel the mechanistic details of IL-37's powerful effects, the research team used the Nobel Prize winning technique, Super Resolution Microscopy, at Monash Micro Imaging and the Monash Institute of Pharmaceutical Sciences. The advanced instruments allowed the scientists to see visualise single molecules of IL-37 and its receptors, showing how IL-37 positions itself on the surface of target cells - something that had never been done before in previous studies in this field.

Dr Claudia Nold said the new findings make the vast potential of IL-37 accessible to drug development.

"Now that we have deciphered these mechanisms, we can pursue the medical potential of IL-37. This can be done by mimicking its effects when there is too much inflammation, or by blocking it when there is too little, like in cancer," Dr Nold said.

DISCOVERING NEW PATHWAYS CONTROLLING DEADLY INFLAMMATION

Hudson Institute researchers in the Centre for Cancer Research have discovered a protein that acts as a brake on inflammation.

The team, led by Drs Tony Sadler and Dakang Xu, and Professor Bryan Williams, has discovered that the protein, PLZF, previously found to be involved in a rare form of childhood leukaemia, actually plays an important role in controlling the incidence of inflammation.

In papers published in the prestigious journals Proceedings of the National Academy of Sciences USA and Nature Communications, the team has described how PLZF is vital to the important process of dampening inflammation, by restricting the expression of inflammatory gene products. In these new studies, they found that PLZF regulated the activity of protective cells called macrophages, controlling their ability to produce protein mediators of inflammation termed cytokines.

"When bacteria or viruses contact macrophages they are detected by specific receptors called Toll-like receptors. These receptors have evolved to become the first line of defence against viruses and bacteria," Professor Williams said.

The team found that the triggering of Toll-like receptors by bacteria, or bacterial or viral products instructs PLZF to dampen but not block the inflammatory response. In the absence of PLZF, higher levels of potent inflammatory cytokines are produced and there are exaggerated inflammatory responses to infections, which can be dangerous.

"The precision of a drug comes from understanding the pathways. That's what we have done here, unravelled the pathways that control inflammation," Professor Williams said.

The next step will be to investigate ways to use this protein to control inflammation.

PRINTABLE BODY PARTS:
NEW 3D BIO-PRINTER TO REVOLUTIONISE HUDSON RESEARCH

In a linkage project led by the Hudson Institute, the Monash Health Translation Precinct will gain a 3D bio-printer in the Cell Therapies Platform of its Translational Research Facility.

In 2014 almost 1,200 Australians were on the waiting list to receive a working kidney. Sadly, many people on this list will die during the 3 - 7 year wait for a transplant. In fact, the total rate of kidney-disease related deaths is about 56 people per day and even those who do receive a transplant face the risk of organ rejection by their body's own immune system.

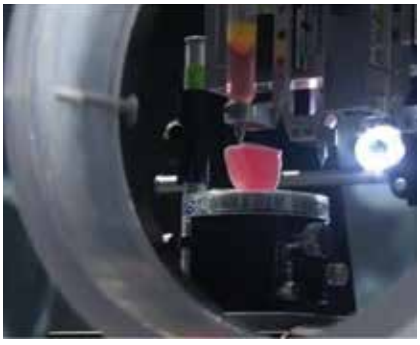


Image: 3D bio-printer printing kidney prototype

Researchers are working to harness the printing capability to give doctors and surgeons the ability to create replacement organs, tissue, skin and even new body parts, using a combination of stem cells and biomatrices.

But what if we could build these types of organs artificially using the patient's own cells, with no waiting period and a reduced risk of rejection? Scientists say this may be possible within the next decade, using similar technology to that found in our regular home and office printers. It is called 3D bio-printing, and it will soon be tested at the Monash Health Translation Precinct (MHTP) in Clayton, by collaborative teams of clinicians and researchers.

Regular 3D printing technology has already been available to the mass market since 2005, giving everyday consumers the ability to create anything from chairs and shoes to hearing aids and musical instruments, by printing layer upon layer of each object using a variety of printing materials.

Now, the technology is being adapted by the brave new world of biomedicine to revolutionise healthcare worldwide. Researchers are working to harness the printing capability to give doctors and surgeons the ability to create replacement organs, tissue, skin and even new body parts, using a combination of stem cells and biomatrices.

In a linkage project led by the Hudson Institute of Medical Research, the MHTP will gain a 3D bio-printer in the Cell Therapies Platform of its Translational Research Facility (due for completion in October 2015). The bio-printer will be one of three technological platforms associated with the new $30 million Biomedical Materials Translational Facility (BMTF), which was established as the result of a partnership between Monash University and the CSIRO with $10 million from the Science and Industry Endowment Fund (SIEF).

Hudson Institute's Professor Graham Jenkin led the charge to seek funding for the 3D bio-printer, which was matched with $800,000 in-kind funding from the Hudson Institute and the School of Clinical Sciences, Monash University. He says the bio-printer has the capacity to harness new business opportunities by offering a one-stop shop when combined with the other technologies funded by the SIEF Grant.

"In addition to the 3D bio-printer, the BMTF features two technology platforms located at Monash University and the CSIRO, comprising clean rooms purpose-built for biomaterial development and characterisation, which the printer will then be able to produce and replicate; as well as state-of-the-art dual PET/MRI imaging equipment, which will provide real-time, comprehensive diagnostic imaging of tissues to be replaced and new tissue in the body to monitor its effectiveness," said Professor Jenkin.

Professor Jenkin says transplantable organs are still close to a decade away from widespread application. However, simpler organs, such as skin and trachea, will be the first to reach patients.

"The 3D bio-printer has the capability to directly drop real skin cells, stabilised in a matrix, over wounded areas of the body to assist in the healing process.

Director of the Hudson Institute, Professor Bryan Williams says researchers at the MHTP will now have the facilities to produce tissue to repair damaged organs, or even new printed body parts for cancer patients designed specifically to fit them.

"The bio-printer will allow our researchers to rapidly translate their discoveries into clinical trials. This technology will enable us to take the first crucial steps towards a revolution in healthcare practices".

SO HOW DOES IT WORK?

The 3D bio-printer is loaded with a 'bio-ink' made up of biodegradable gel and human stem cells.

The printer then deposits tiny droplets of the bio-ink onto a biocompatible scaffold, layer upon layer, which gradually builds up to make the structure.

The cells anchor onto the scaffold and begin making tissue. As this occurs, the scaffold disintegrates, leaving a living body part ready to transplant into the person whose own cells created it.

Therefore the body is unlikely to reject the implanted part as it will not be registered as a foreign object, as in the higher-risk case of transplanting parts from another person's body.

IMAGE: BIOCOMPATIBLE SCAFFOLD

Ride for Research celebrates its 10th anniversary with the most successful event yet

This year, the Hudson Institute's annual fundraising event 'Ride for Research' has raised a record $35,700 for vital research equipment for the Institute.

The 2015 Ride for Research, held on 28-29 March, was the 10th anniversary of the event, which is run through the wider 'Murray to Moyne' cycle relay, an event that supports hospitals and health services throughout Victoria.

The Institute's 16-person team, comprising researchers, volunteers and sponsors, began the gruelling 520 km, relay-style ride in Echuca and finished up in Port Fairy 24 hours later, after very little sleep. Event veteran and key organiser, Andrew McCallum, from the Institute said that the team escaped with no injuries and only one flat tyre this year.

"There were some very tired bodies laid out in Port Fairy after the team reached the finish line. The whole team performed extremely well and they should be very proud of themselves," said Mr McCallum.

Funds raised from this year's event will support the purchase of an xCELLigence System, which will expand the Institute's research capability, as the advanced technology will allow researchers to monitor cell behaviour in real time.

This will accelerate research into infertility, placental insufficiency, immunological diseases such as septic shock, hypertension and influenza A infections, as well as cancer, as researchers will be able to track the cellular movement of cancer growths.

Hudson Institute Director, Professor Bryan Williams, said the success of the event was only possible thanks to the efforts of the tenacious Ride for Research Team, supporters, and sponsors BankVic, VicSuper, Davies Collison Cave and Zouki.

"It has been a phenomenal show of support for the event to have been so successful in its 10th year. The Ride for Research has now raised more than $235,000 towards much-needed research equipment since it began and we are very lucky to have such committed, long-term supporters," said Professor Williams.

The Ride for Research began in 2006 at Prince Henry's Institute and has become a reliable source of funds for the Institute as it looks to fundraising activities to cover gaps in funding created by a drop in project grant funding from the Federal Government to just 14.9 per cent of applications in the last round.

"Fundraising events such as this are crucial to our sustained success. We will rely on a mix of funding from government, industry, philanthropic organisations and the public to ensure our research continues through these tough times," said Professor Williams.

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