HUDSON
INSTITUTE OF MEDICAL RESEARCH

SUMMER 2022

HUDSON **NEWS**

"We're very proud that out of such a dark time for our family we also did something good."

Please support our Infants' Health Appeal

Hudson Institute of Medical Research
27–31 Wright Street
Clayton VIC 3168
Australia

t: + 61 3 8572 2700
e: info@hudson.org.au
w: hudson.org.au

Director's message

Professor Elizabeth Hartland

A time to celebrate

This is the time of year when we look back at what we have achieved and acknowledge the people who helped us make it happen.

We also look ahead to the promise of our current and future research, perhaps allowing ourselves to dream a little of what could be possible.

In this festive issue of *Hudson News*, we are proud to officially launch our **Infants' Health Appeal**, which will raise funds for our critical paediatric health research and bring hope for families who need it most.

Families like the Lindners, who found themselves in a situation every parent dreads, when their daughter Jessica contracted brain cancer and died at age 13.

As you will read, they chose to turn their grief into hope, and through their generosity our cancer researchers will soon have another weapon in their arsenal to fight this disease.

In our story on Professor Suzanne Miller you will read about clinical trials that are now under way, providing real hope to parents of very premature babies – it is precisely this type of research that your donations allow us to continue.

The flip-side is that our mid-career researchers who are doing amazing work are spending too much of their valuable research time applying for scarce funding opportunities.

The less we have to rely on grants and time writing them, the more time we can spend on discovery science and translating those discoveries into treatments.

I trust you'll enjoy reading more about our research in this newsletter and I invite you to read more about our work on our website.

On our website you'll also read even more about treatments like the 3D printed mesh being developed by our pelvic organ prolapse team, made from a woman's own cells and designed to work with her body, not against it.

Or the big strides we're making in male infertility, opening the door for treatments that could restore men's fertility after it has been damaged by chemotherapy.

And there's our RNA work, which brings us closer every day to creating a whole new class of anti-inflammatory drugs, as well as technology to make vaccines both more effective and cheaper to manufacture.

These are just a few examples of the work we are proud and determined to advance, which you can stay up to date with by subscribing to our mailing list.

For those who generously donated to our Women's Health Appeal earlier in the year, thank you for your amazing support.

We hope you are inspired to give generously to our **Infants' Health Appeal**, enabling our scientists to solve the biggest health challenges facing our smallest and youngest patients.

So again, I thank you, I wish you well for the festive season and beyond and look forward to bringing you more stories of hope and achievement in the coming year.

Professor Elizabeth Hartland
Director and CEO

Cover image: Baby Max and mother Susana

In this issue

- Special delivery – keeping preterm babies healthy
- Creatine during pregnancy – a scientist's story
- Finding and treating newborn brain injury
- Newborns benefit from delayed cord clamping
- Can IBD be cured? The answer lies within
- Family's community rallies for hope from cancer research
- Baby Jack update

Keep up to date with Hudson Institute's latest discoveries. Sign up to our mailing list at www.hudson.org.au

Support life-saving research by making a tax-deductible donation today.

w: hudson.org.au
t: + 61 450 524 565
e: donations@hudson.org.au

Hudson Institute of Medical Research
27–31 Wright Street
Clayton VIC 3168

Special delivery – keeping preterm babies healthy

When baby Max arrived – early and in a hurry – no-one realised he would play a vital part in keeping other preterm babies healthy in the future.

The morning after her obstetrician advised her to monitor symptoms and any sudden changes, Max's mother Susana gave birth at just 27 weeks and three days.

"We knew the odds for a baby born so early – it was very daunting," Susana said.

Supporting preterm research

Susana was aware of the dangers to vital organs such as lungs, heart, gut and brain. So, when doctors in Monash Children's Hospital's neonatal unit asked if she would like her newborn son to be the first participant in a trial of a new treatment to prevent those issues, she readily agreed.

"It just felt right to us."

"We're very proud that, out of such a dark time for our family, we also did something good," she said.

The trial involved the drug anakinra to prevent dangerous inflammation. This drug has been used successfully for the past 20 years to treat severe inflammatory diseases, but this is the first time it has been used in preterm newborns, and the results are promising.

This is just one of several areas of research showing great promise under the guidance of a team led by Professors Marcel and Claudia Nold.

continues on next page...

Above: Baby Max at 8 weeks about to go home

Right: Baby Max at 5 months old with mother Susana

L-R: Professor Marcel Nold and Professor Claudia Nold

Progress for preterm birth research

This year, the team published a significant study in the journal *Science Translational Medicine*, identifying that a particular type of inflammation drives lung and heart disease in preterm babies.

"This new knowledge allows us to work on ways to control inflammation and prevent lifelong health problems," Prof Marcel Nold said.

The team's work identified the specific inflammatory responses that can cause lung and heart disease, and pointed to risk factors that obstetricians and paediatricians should avoid.

"With some existing treatments, we have identified the specific mechanisms by which they make a difference, while for others, we've found that just delaying their use can have a significant benefit," he said.

The work of this husband-and-wife team is leading to changes in the way the youngest babies are managed in the days and weeks before and after birth.

Professor Claudia Nold says their work also validates several current practices. "We know that giving the mother magnesium sulphate and glucocorticoids before birth helps protect preterm babies, but since our study we better understand the mechanisms by which they work."

Leading changes for preterm babies

Because early-life disease often leads to lifelong health issues, the Nolds' ultimate goal is to prevent preterm babies developing ongoing conditions. Understanding how the damage occurs is a huge step in that direction.

As for baby Max, he's showing every sign of being a happy, healthy young boy, with a pair of proud and relieved parents.

"I never thought I'd be in a position to be part of a medical research trial, but I'm proud that we did – we've brought some good to the world," Susana said.

Premature baby facts

- **One in 10** Australian babies is born premature.
- Inflammatory responses in preterm babies can cause **permanent damage** to the heart, lungs, brain, gut and the blood vessels.
- Necrotising enterocolitis (NEC) is a disease of the premature gut that can **kill up to two thirds** of affected babies, and cause grave **long-term illness** in survivors.
- Bronchopulmonary Dysplasia (BPD) is the most common chronic lung disease affecting newborn babies.

Susana hopes other families make the decision to donate to keep life-changing research going.

Please support our Infants' Health Appeal

Creatine during pregnancy – a scientist's story

There are times when a researcher's personal and professional worlds collide. One of those times came late last year for Dr Stacey Ellery, who researches the use of creatine during pregnancy.

Dr Stacey Ellery and son Archie

Creatine facts

- Creatine supplies and helps to renew energy for our cells.
- Half our daily creatine requirement comes from fish, meat and dairy products. Our bodies make the other half naturally.
- During pregnancy, creatine is transferred from mother to developing baby through the placenta.

As a researcher, Dr Ellery was well aware of the theory that supplementing the mother's natural creatine intake improves the likelihood of conceiving and delivering a healthy baby. But when she was starting a family, the academic became personal.

The health of her unborn baby was her primary concern, so Dr Ellery turned to science to help decide whether creatine supplementation was the right choice.

"There is growing evidence that creatine may be essential for energy production in a range of reproductive tissues, as well as for the growing and developing baby," she said.

Protecting the newborn brain

But the potential benefits go beyond growing a healthy baby to what can happen if things don't go smoothly.

"There is evidence that increasing fetal levels of creatine before birth may help minimise injury to the baby when there are complications during labour that reduce oxygen delivery to the baby," she said.

"We are finalising our preclinical studies on whether increased fetal creatine reserves can protect the newborn brain from complications around birth, and whether creatine may be an essential supplement for babies born preterm, who are vulnerable to brain injuries.

"This research has focused on protecting the newborn brain and reducing the risk of lifelong conditions such as cerebral palsy."

Creatine – a scientist chooses

Knowing that creatine could potentially help bring about a healthy baby and a safer delivery, the last box that needed to be ticked was safety – and that's a topic in which Dr Ellery is an expert.

Her research has so far found no evidence of death or serious adverse effects due to creatine, and no record of milder side effects, such as an upset stomach.

"I was comfortable with the safety data, but I knew we still have work to do," she said.

In consultation with her obstetrician, Dr Ellery chose to take a five-gram creatine supplement a couple of times a week and she tried to regularly eat creatine-rich foods, mainly fish and red meat.

"I was fortunate to conceive relatively quickly and had a very straightforward pregnancy," she said. "As a scientist, I know there's absolutely no way to tell whether creatine helped. But the experience definitely cemented my resolve to find out, through continuing our research."

And the research is heading in several different directions.

"Finally, we are seeking funding to answer how important creatine is for prospective mums and dads around the time of conception, including in IVF, as this area remains largely unexplored," she said.

Photograph of Dr Stacey Ellery and baby Archie by Ian Currie (www.iancurrieportfolio.com)

"Your contribution will make a real difference to people's lives."

Professor Elizabeth Hartland
Director and CEO

Hudson.org.au
HUDSONResearchAU
Hudson_Research
Hudson-Research
Hudson_Research

Professor Suzanne Miller

Finding and treating newborn brain injury

The devastating effects of newborn brain injury are well known, and Professor Suzanne Miller's aim is to be able to detect and treat those injuries in time to make a difference.

In her new role as head of The Ritchie Centre Hudson Institute, Prof Miller is guiding teams of researchers working on both prevention and cure of these critical conditions.

On top of her own distinguished career as a neurodevelopmental physiologist and researcher, Prof Miller is now leading several teams doing groundbreaking work in this area.

Prevention and cure of newborn brain injury

There's an alphabet of lifelong conditions to prevent, ranging from cerebral palsy (CP) to bronchopulmonary dysplasia (BPD) and necrotising enterocolitis (NEC) to autism and ADHD, all of which become more likely when a baby is born prematurely, or with other complications that cause neonatal brain injury.

The key, and Prof Miller's ultimate goal, is identifying the danger signs as early as possible.

And with neonatal medicine increasing the survival rate of the most vulnerable babies, she predicts an increase in the number of children with adverse long-term outcomes.

"There is certainly a knowledge gap in identifying those more subtle brain injuries early enough to make a positive difference," Prof Miller said.

"These children have a higher likelihood of learning difficulties at school, but we're not very good at identifying them before they get to school age.

"It would be fabulous if we were able to identify brain injury in newborn infants as early as possible, so that the interventions we're developing – whether that's stem cells or anti-inflammatories or melatonin could be implemented ASAP."

Lack of funding impedes progress

The Ritchie Centre is currently running clinical trials on two of these treatments, but as with all their research, the number-one impediment to serious progress is lack of funding.

"We have talented mid-career researchers who have established their research careers and are doing fabulous work, making huge progress, and we simply can't get funding for their salaries," Prof Miller said.

"They will have spent at least 30 per cent of their time this year applying for funding – effectively competing against each other, but if we had enough money they would all just be getting on with their research.

"What could we be achieving then?"

"Please support our researchers so they can continue making progress in the prevention of newborn brain injuries with a gift to our Infants' Health Appeal today.

Newborn brain injury facts

- **Every 15 hours**, an Australian baby is born with a brain injury that underlies cerebral palsy.
- Up to **1 in 10** babies require help to breathe in the first few minutes of life.
- In **13 out of 14** cases in Australia, the brain injury leading to cerebral palsy occurs either in the uterus or before 1 month of age.

Newborns benefit from delayed cord clamping

L-R: Dr Doug Blank, Professor Graeme Polglase, Professor Stuart Hooper

Small changes can sometimes have big impacts — just ask Drs Doug Blank and Shiraz Badurdeen. Their clinical trial of delayed cord clamping proved that a simple change to the way newborn babies are handled can make a huge difference to their lives.

It builds on groundbreaking research being carried out at Hudson Institute by Professor Stuart Hooper and Professor Graeme Polglase, who first demonstrated the benefits of delaying cord clamping in 2013.

Dangers of birth asphyxia

Up to one in 10 newborns struggle to take their first breath and the traditional way of dealing with this problem is to take the baby away to a respirator or other equipment.

"That means cutting the umbilical cord and separating the baby from the mother and the placenta that has been providing all its oxygen and nutrients for months," Dr Blank said.

"If the baby doesn't breathe after birth and the umbilical cord is clamped or cut, there is no oxygen going to the baby until the doctors and nurses are able to successfully push air into the baby's lungs.

"That process often takes over two to three minutes."

The dangers of birth asphyxia (oxygen starvation) in these circumstances are well known and can include serious and life-changing conditions such as cerebral palsy.

Benefits of delaying cord clamping

"With delayed cord clamping we bring the equipment to the baby, so it can remain connected to the placenta and there will still be a supply of oxygen to support it before it can breathe on its own," Dr Blank said.

"This process is free, available to everyone, worldwide, and takes advantage of a previously ignored resource, the placenta."

Their research, published in *PLOS Medicine*, bridges the gap across the umbilical cord between the obstetrician and the paediatrician — encouraging the two providers to stand shoulder-to-shoulder to improve the care of newborns.

Can IBD be cured? The answer lies within

The secrets to what controls the body's inflammatory responses hold the answer to a question thousands of Australians are asking: "Can inflammatory bowel disease (IBD) be cured?"

Paediatric gastroenterologist and Senior Research Scientist Dr Edward Giles has seen the effects of inflammatory bowel disease on people of all ages, particularly children.

What is IBD?

"Inflammatory bowel disease has two main forms – Crohn's disease and ulcerative colitis — both incurable disorders, where the immune system attacks the bowel, despite there being no infection to fight," Dr Giles said.

What are IBD's symptoms?

Symptoms can range from bloody diarrhoea to involuntary weight loss, and even joint swellings or eye inflammation.

It's a condition 23-year-old nurse Marisa Coniglione knows all too well. She's had ulcerative colitis (UC) since she was 11, and Dr Giles is her treating specialist. "UC is invisible – no-one understands the suffering, so it doesn't get public attention," she said.

Its impacts on her young life have been profound: "I had a lot of time in hospital when I should've been at school."

Can IBD be cured?

Marisa now works in the emergency department at Monash Health – Casey Hospital, and takes extra interest in patients with IBD.

"Often they've just been diagnosed, so there's a lot to get used to," she said.

While Marisa forges her own career in healthcare, Dr Giles is working on new avenues for IBD treatments, looking for the answer to that question: Can IBD be cured?

"Our research aims to understand how the body reacts to the trillions of bacteria and other bugs inside us — our microbiome," he said. "By doing this, we can identify newer and safer treatments than our current agents that are not completely effective and have significant side effects.

Dr Edward Giles

"We also are hoping to better understand the relationship between diet, the microbiome and immune response. By doing this we will make better and more personalised treatments for patients and hopefully learn how to prevent the disease altogether.

"The goal of our world-leading research into the microbiome and immune response, is to deliver the next generation of treatments for the millions of IBD sufferers worldwide."

Marisa's message for Dr Giles and his colleagues is a simple one: "Thanks for the research — it always gives me hope that one day I'll be OK."

Marisa Coniglione

Please send me further information about

- ☐ Making a regular, automated donation to Hudson Institute
- ☐ Remembering Hudson Institute in my Will (strictly confidential)
- ☐ I have included a gift in my Will to Hudson Institute (strictly confidential)

Please change my communications

- ☐ I no longer wish to receive *Hudson News*
- ☐ I only wish to receive *Hudson News* by email (as per my email details on this form)

For all other enquiries, please contact us

t: +61 3 8572 2700 (9am–5pm)
e: donations@hudson.org.au

Yes, I would like to make a donation to groundbreaking research for Infants' Health

Please fill out this form and return in the enclosed reply paid envelope
(Or you can make a secure online donation at hudson.org.au)

Yes, I will support groundbreaking medical research

☐ $100 ☐ $250 ☐ $500 ☐ My choice

Cheque (made payable to 'Hudson Institute of Medical Research')

Please deduct the above amount

Once ☐ Monthly ☐ Annually ☐

Visa ☐ Mastercard ☐ AMEX ☐

Cardholder's name BLOCK LETTERS

Card number

Expiry date MM YY **CVC**

Signature

My contact details

Title **Name** FIRST SURNAME

Address POSTCODE

Suburb STATE

Phone

Email

Please forward my receipt to

☐ My email address
☐ My postal address

Thank you, your donation is powering new treatments and cures!

Your gift of $2 and over is tax deductible.

HUDSON INSTITUTE OF MEDICAL RESEARCH

FESTIVE2022

Hudson Institute (ABN 48 132 025 024) protects your privacy in accordance with the information Privacy Principles of the Information Privacy Act 2000.

Family's community rallies for hope from cancer research

Jessica Lindner

When the Lindner family generously requested donations to Hudson Institute's paediatric brain cancer research in lieu of flowers after the passing of their daughter Jessica, their community rallied behind their wish.

Jessica sadly passed away in July at the age of 13 after a brave fight with a rare brain tumour. Messages of love and support for the family, celebrations of her beautiful spirit and how much she would be missed shone through in the comments that accompanied donations in her memory.

Together, to bring hope to other families who might find themselves in a similar situation, friends, family and colleagues of Susi and Luke Lindner raised close to $10,000 in support of further research into rare childhood cancers. A matching gift was generously provided by Invetech, Luke's employer.

Hope for families like theirs

When asked what he hoped the donations would achieve, Jessica's father Luke said, "By raising funds in Jessica's name for this important research, we are hopeful that one day another family won't have to lose a child to a similar disease."

As a result of the nearly $20,000 raised, Hudson Institute will be able to purchase a digital microscope with computer software that allows us to recognise and analyse cancer cells grown from patients. It will also be a great tool for training PhD students, medical students and paediatric oncology research fellows in childhood brain cancer research.

To further acknowledge the beautiful life of Jessica and thank the family's community of supporters, the new equipment will be unveiled with her family present in the lab at our Cancer Centre later this year, with a plaque dedicated to her memory.

More information can be found and donations made in Jessica's honour to benefit further research into cancer at: **donate.hudson.org.au/memory/2/jessica-lindner**.

Baby Jack with mother Dani

Baby Jack update

You may remember Baby Jack from our *Hudson News* Summer 2021 edition. Jack was born premature at just 24 weeks and endured several setbacks in his first two months, including being put on a ventilator when seizures prevented his breathing. He was also at risk for BPD and cerebral palsy.

We are very happy to share a positive update from his parents on Jack at the time of going to press. He was discharged by his medical team some time ago, and recently celebrated his first birthday. He is starting to say words like 'Mum' and 'Dad' and absolutely loves food. His parents are working with a physio on his fine motor skills and overall development.

You can make a difference to the lives of preterm babies like Max by supporting our Infants' Health Appeal today.

Baby Max with mother Susana

Please support our Infants' Health Appeal

Have you considered what your legacy could achieve with a gift in your Will?

Leaving a gift in your Will to Hudson Institute will allow us to power new and innovative treatments and cures for this and future generations.

Our team is here to help with any queries. Please contact Connie Honaker at

t: + 61 450 524 565
e: connie.honaker@hudson.org.au