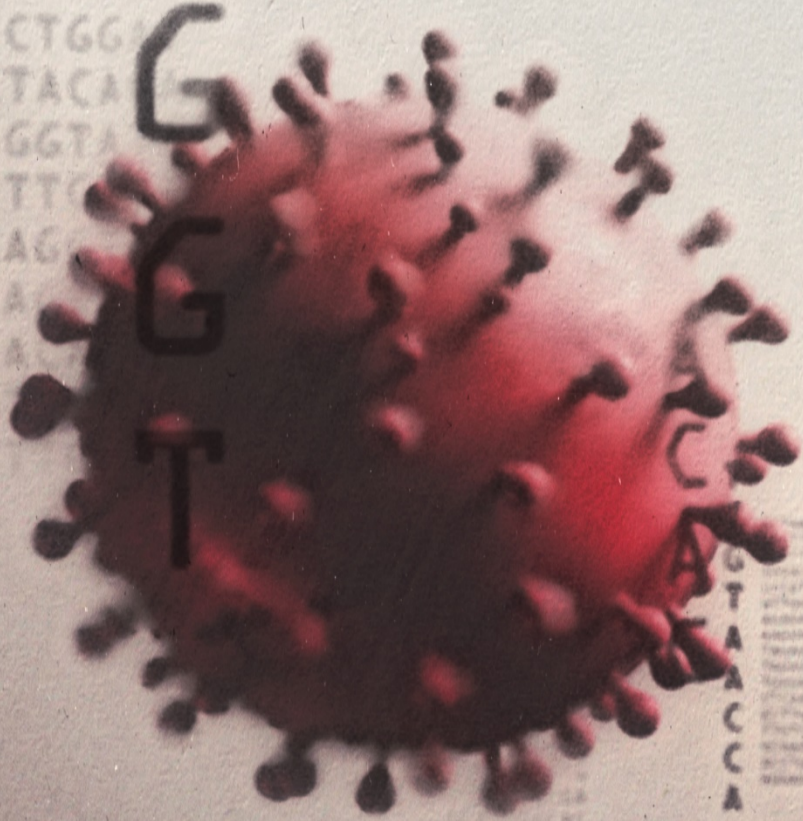


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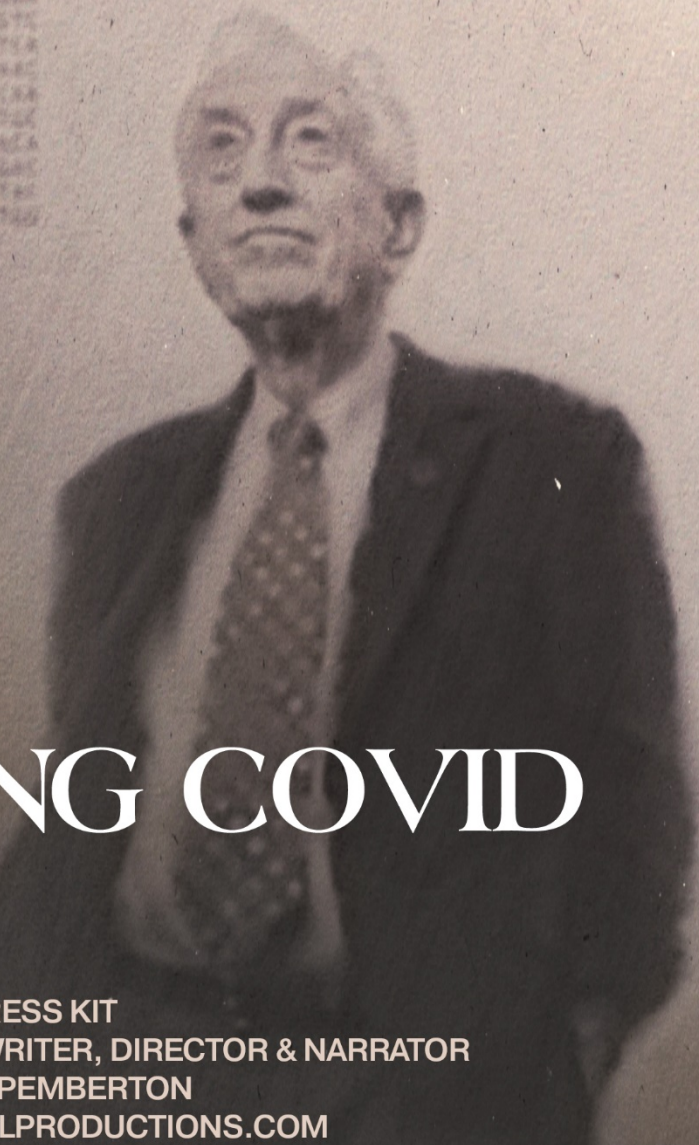
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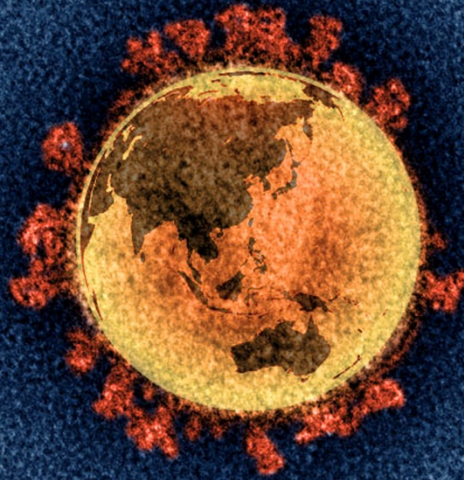


CRACKING COVID

PRESS KIT
EXECUTIVE PRODUCER, WRITER, DIRECTOR & NARRATOR
SONYA PEMBERTON
WWW.GENEPOLPRODUCTIONS.COM

“Well, this is lockdown’s near forbidden secret and terrible truth – that at the heart of grief, and midst mayhem, carnage and deep sadness, people do beautiful things.”

Nick Cave



CRACKING COVID

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SYNOPSIS

SHORT SYNOPSIS

CRACKING COVID tracks the real-time story of Australia's scientific response to the pandemic, told by researchers, clinicians, and patients. A surprisingly tender tale of hard science.

ONE PARAGRAPH SYNOPSIS

CRACKING COVID is a rollercoaster real-time journey through Australia's unique pandemic experience. As teams of scientists race to unlock the secrets of the virus, researchers work at breakneck speed to build a vaccine from scratch, and three patients confront very different symptoms of a terrifying new disease. *Professor Peter Doherty* – who won a Nobel Prize for his discoveries about the human immune system – joins Emmy Award-winning filmmaker *Sonya Pemberton*, providing warm and witty expert insight. We discover how, in uncertain times, we often have little choice but to improvise. **CRACKING COVID** is a surprisingly intimate story of Australia's race against the virus – as it happened, in the moment.



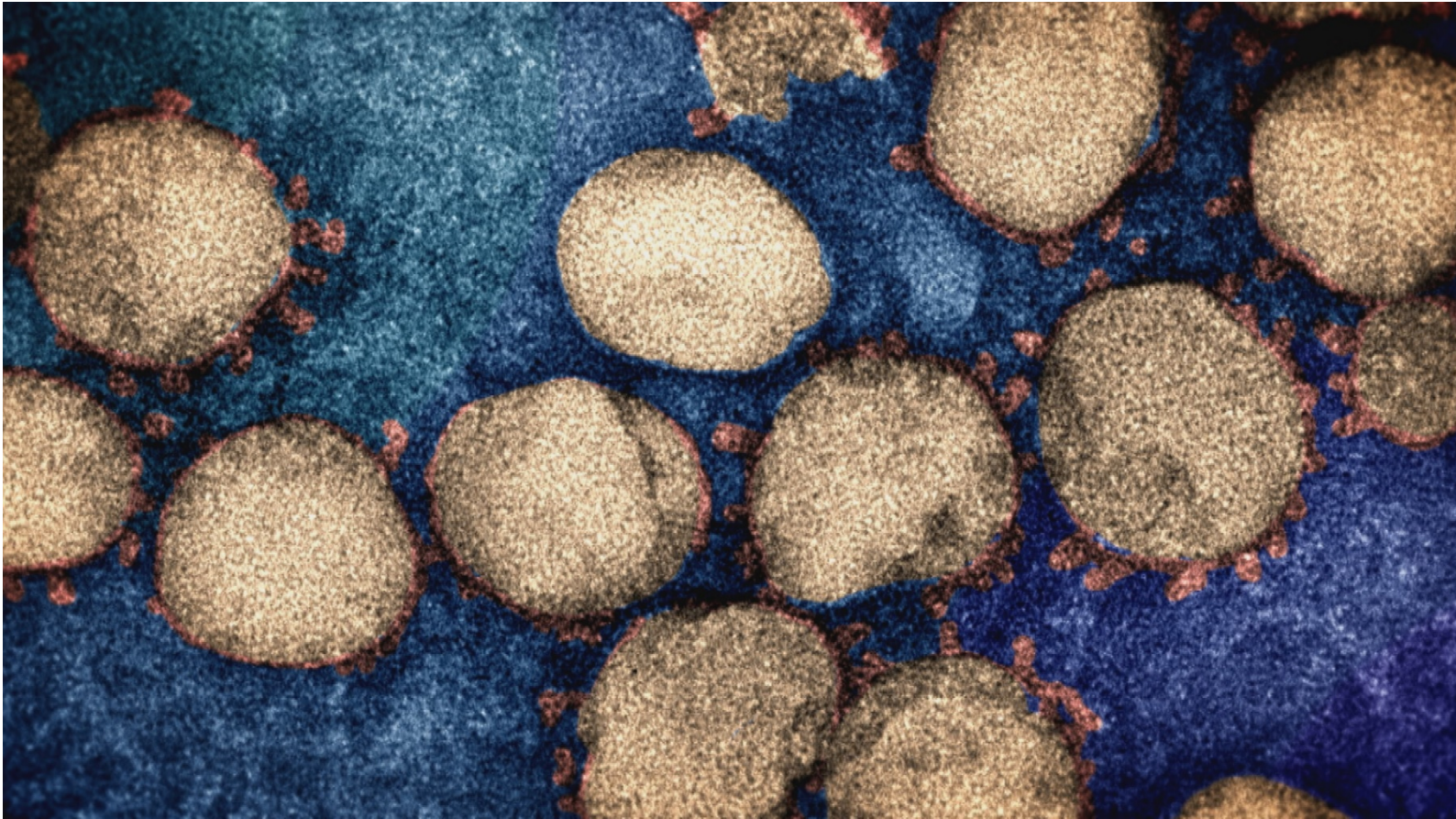


Image: SARS-CoV-2 colourised. Supplied by Bio21 and Doherty Institute

LONG SYNOPSIS

CRACKING COVID: INSIDE AUSTRALIA'S RACE AGAINST THE VIRUS

By definition they are universal, but pandemics can also be intensely personal things.

CRACKING COVID, a new documentary from Emmy Award-winning Melbourne filmmakers *Genepool Productions*, delivers powerful and penetrating insights into the emotional and physical responses of Australia's coronavirus victims, clinicians, vaccine researchers – and even musicians.

Recorded in real time over the past year, we see the fear, the challenges, the tragedies and joys of ordinary Aussies as their lives are profoundly changed, and sometimes ended, by a virus that is both strange and a stranger to medical science.

Filmmaker and narrator *Sonya Pemberton* joins *Professor Peter Doherty* – who won a Nobel Prize for his discoveries about the human immune system – in a series of Zoom chats across many months. *Professor Doherty*, warm and witty, provides immediate and informed commentary as Melbourne, Australia and the world struggles to control rising case numbers.

In the Melbourne institute that bears *Doherty's* name, as well as in research labs in other parts of the countries, scientists race to understand the virus, to find its weaknesses, and to develop a vaccine against it.

Pemberton is a fly on the wall – or, at least, an eye on the Zoom meetings – as the teams work to build a

defence in a high-stakes, ultra-competitive contest to defeat SARS-COV-2. We see determination, concern, soaring optimism and crushing defeat, as Australia's best hope for a vaccine fails at final fence.

As the numbers rise, **CRACKING COVID** never forgets that each case is an individual – unique, connected and loved.

We meet *Michael Rojas*, whose life hangs in the balance as he's placed into an induced coma in ICU. Why is he so unwell? Tracking the body's immune response to COVID-19, alongside the journey of Michael's surrounding family, we gain deeper understanding.

Then there is *Leila Sawenko* and her three children. She develops symptoms, but her kids do not. Does their apparent immunity hold a vital clue? Researchers are anxious to find out.

And then there is *Mirabai Nicholson-McKellar*, whose initial infection is mild, but who then develops the crippling and debilitating symptoms of "long COVID". Doctors struggle to understand why this formerly vibrant young woman is dragged ever lower by a virus that for most people resolves in just a few weeks.

Pemberton – whose previous award-winning documentaries include the Emmy Award winning *Immortal*, *Vitmania* and *Jabbed: love fear and vaccines* – suddenly finds herself a player in her own show when her hometown of Melbourne enters strict lockdown for 111 days. Like the other five million people in the city, she experiences a profound sense of dislocation, unease and – when the lockdown at last ends – fear and gratitude.

The effects of the pandemic extend far beyond the laboratories and clinics of the world. It is also challenge to artists of all types as they grapple with how to respond to a threat that is simultaneously ubiquitous and intensely personal.

Among them is Melbourne composer *Dale Cornelius*, who responded by launching a project called '52 Fridays', which found him filming his improvisations on piano and other instruments, reaching to provide an aural ode to the outbreak. Dale's music provides a telling and deeply emotional soundtrack to **CRACKING COVID**.

CRACKING COVID is the surprisingly intimate story of Australia's race against the virus – as it happened, in the moment, and on the fly. This is not a history. It's a race-call.

CRACKING COVID airs on ABC TV 8.30pm Tuesday 13th of July.





G_P_R_E_N_E_(P_O_O_L)_S P_R_O_D_U_C_T_I_O_N_S

Based in Melbourne, Australia, **Genepool Productions** specialises in creating quality science documentaries for Australian and international audiences. Sonya Pemberton, 2012 Emmy award winner and record breaking five-time winner of the prestigious Eureka Award for Science Journalism, leads the company.

Previous projects include the critically acclaimed and multi-award-winning science documentaries, **Immortal**, **Catching Cancer**, **Jabbed – love, fear and vaccines**, **Vaccines - Calling the Shots** and **Uranium-Twisting the Dragon's Tail**. Genepool's latest project **Vitamania - the sense and nonsense of vitamins** dissects the multi-billion-dollar vitamin industry. **Genepool** works in partnership with scientists and broadcasters across the world.



KEY CHARACTERS

THE RESEARCHERS

NOBLE LAUREATE PROFESSOR PETER DOHERTY

Peter Doherty shared the 1996 Nobel Medicine Prize with Swiss colleague Rolf Zinkernagel, for their discoveries about transplantation and “killer” T cell-mediated immunity, an understanding that is currently translating into new cancer treatments. The first veterinarian to win a Nobel, he was Australian of the Year in 1997. Still active in research on immunity to influenza at the Peter Doherty Institute at the University of Melbourne, where he now spends most of his professional time.



Apart from his scientific output that can be found on PubMed, he is the author of several “lay” books, including *A Light History of Hot Air*, *The Beginners Guide to Winning the Nobel Prize*, *Sentinel Chickens: What Birds Tell us About our Health and our World*, *The Incidental Tourist*, and, critically, *Pandemics: What Everyone Needs to Know*. Passionate about promoting an evidence-based view of reality, his book *The Knowledge Wars* is a “warts and all” view of science for non-scientists, even for people who don’t like science. In 2021 Peter Doherty’s book *An Insiders Plague Year* will be published, recounting his response to the pandemic as it developed.

PROFESSOR SHARON LEWIN AO

Director, Doherty Institute



Leading infectious diseases physician and scientist who is internationally renowned for her research into all aspects of HIV disease and pathogenesis, *Professor Sharon Lewin* is the inaugural Director of the Doherty Institute. She is also a Professor of Medicine at The University of Melbourne and a National Health and Medical Research Council (NHMRC) Practitioner Fellow. As an infectious diseases physician and basic scientist, her laboratory

focuses on basic, translational and clinical research aimed at finding a cure for HIV and understanding the interaction between HIV and hepatitis B virus.

She was named Melburnian of the Year in 2014, and in 2015, was awarded the Peter Wills Medal by Research Australia. In 2019 Sharon was appointed an Officer of the Order of Australia (AO) in recognition of her distinguished service to medical research, and to education and clinical care, in the field of infectious diseases, particularly HIV and AIDS.

PROFESSOR EDDIE HOLMES

Virologist, University of Sydney

Professor Eddie Holmes is known for his work on the evolution and emergence of infectious diseases, particularly the mechanisms by which RNA viruses jump species boundaries to emerge in humans and other animals. He currently holds an ARC Australian Laureate Fellowship. He moved to the University of Sydney in 2012. He has studied the emergence and spread of such pathogens as SARS-CoV-2, influenza virus, dengue virus, HIV, hepatitis C virus, myxoma virus, RHDV and *Yersinia pestis*.



His previous appointments include Verne M. Willaman Chair in the Life Sciences at the Pennsylvania State University, USA, and Affiliate Member of the Fogarty International Centre (2005-2012), National Institutes of Health, USA. From 1999-2004 he was Fellow of New College, Oxford. He is also an Honorary Visiting Professor at Fudan University, Shanghai.

DOCTOR JULIAN DRUCE

Virologist, Doherty Institute

Head of Virus Identification Laboratory. *Doctor Julian Druce* is the Senior Medical Scientist in the Virus Identification Laboratory of the Victorian Infectious Diseases Reference Laboratory (VIDRL). His laboratory has responsibility for detection of viruses affecting humans including respiratory viruses, herpes viruses, enteroviruses, flaviviruses, alphaviruses, pox viruses and many more. His work practices span Biosafety levels 2, 3 and 4 and he operates laboratories at all these levels. His



laboratory is designated as one of three World Health Organization (WHO) National Influenza Centre (NIC) laboratories, a WHO Regional Measles Reference Laboratory, and houses the National High Security Quarantine Laboratory (NHSQL) for diagnosis of high-level pathogens causing viral haemorrhagic fever.

PROFESSOR KATHERINE KEDZIERSKA

Immunologist, Doherty Institute



Professor Katherine Kedzierska is the Head of the Human T cell Laboratory in the Department of Microbiology and Immunology and an NHMRC Senior Research Fellow Level B. Her principal area of expertise is viral immunology. She received her PhD from Monash University in 2002. Her PhD, performed at the Burnet Institute with Professor Suzanne Crowe, studied immunity to HIV infection and the mechanisms of disease pathogenicity. As an

NHMRC Peter Doherty Fellow in the Department of Microbiology and Immunology with Laureate Professor Peter Doherty, Katherine undertook research into the key mechanisms underlying immunological T cell memory formation and persistence. Subsequently, as an NHMRC RD Wright Fellow, then an NHMRC CDF2 Fellow, Katherine has established her independent research on universal immunity to human influenza viruses.

PROFESSOR PAUL YOUNG

Virologist, The University of Queensland

Professor Paul Young is the Head of The University of Queensland's School of Chemistry and Molecular Biosciences and also an Affiliated Professor for Bioengineering and Nanotechnology. He is the President of the Australian Society for Microbiology and the President of the Asia Pacific Society for Medical Virology and an Investigator for the Australian Infectious Diseases Research Centre.



His current work is focused on research into viral replication that employs molecular and structural biology and protein chemistry. Understanding the process of viral replication is essential for the development of improved diagnostics, vaccines and anti-viral therapeutic control strategies.

ASSOCIATE PROFESSOR KEITH CHAPPELL

Virologist, The University of Queensland

Associate Professor Keith Chappell is Principal Research Fellow at the School of Chemistry and Molecular Biosciences at The University of Queensland and an Affiliated Professor for Bioengineering and Nanotechnology. His research focuses on understanding medically and environmentally important viruses and bacteria, including Influenza, Ebola, Koala Retrovirus, Respiratory Syncytial virus (RSV), Dengue virus (Den), West Nile Virus (WNV) and Streptococcus pneumoniae.



During three years as a post-doctoral researcher at Spain's Instituto Salud Carlos III, Dr Chappell researched the way respiratory viruses use proteins on their surface to bind to cells in the human body. Upon his return to Queensland, Dr Chappell and Professor Paul Young started work on a "molecular clamp" that could hold the proteins in their shape.

THE PATIENTS

MICHAEL ROJALES

Severe COVID



Michael Rojas was one of three family members who contracted SARS-CoV-2. 46-year-old *Michael Rojas* had returned from a trip to South Africa on 19 March 2020. Two days after his arrival in Melbourne he began to feel a temperature and relentless cough. Michael went to a fever clinic on 22 March and the next day was told he was positive for coronavirus. Three days later, he was admitted to Casey Hospital after struggling to breathe. On 29

March, his fourth day in hospital, he was moved to intensive care at Monash Medical Centre in Clayton and put into an induced coma.

Michael woke from his coma after two weeks, on Easter Sunday (12 April), was cleared of the virus on 26 April, and finally returned home on 5 June. Whilst in an induced coma his wife *Rachel* also battled the virus in hospital, leaving their 17-year-old daughter *Megan* alone at home. His 84-year-old mother-in-law *Gely Costanilla* tragically succumbed to the virus.

The family who migrated from Las Pinas to Australia 25 years ago are deeply connected with Filipinos in Melbourne's south-eastern suburbs. *Michael Rojas* is a pastor at the Berwick Church of Christ.

MIRABAI NICHOLSON-MCKELLAR

Long COVID

Mirabai Nicholson-McKellar is a COVID-19 survivor. Her illness is far cry from the drama and horror of the ICU. Instead, she represents a new and fast-growing global group of survivors – called the 'long haulers'. Her type of strange and debilitating illness has been dubbed 'long COVID'.



In early March 2020, 34-year-old *Mirabai* was living in Berlin when she started to get odd symptoms.

Nerve pain. Fatigue. Aching body. She had no fever, no cough, no shortness of breath. Then, suddenly, she woke up with no sense of smell or taste. After 10 days or so, she tried to get tested, but did not qualify; back then, her symptoms did not fit the COVID-19 bill.

Upon returning home to Byron Bay, Mirabai finally tested positive for coronavirus and began many months battling the disease. Her symptoms include severe chest pain, shortness of breath, fatigue, brain fog and more. These would lift for a while, only to return, causing her to crash again and again. She has been admitted to hospital emergency twice. “It has been a crazy roller-coaster, I take 2 steps forward and 1 step back”.

On day 60, she was still testing positive, but doctors determined the tests were detecting non-infectious viral remnants, as nothing grew in the lab. So, after two months she was finally released from home isolation. Now 15 months after her first symptoms, she is still unwell and struggling. “I don’t remember what normal feels like”, she says.

As she struggles to recover, *Mirabai* is on a mission to try to find out why she - and so many young people - are so unwell, so long after infection. “I’m really curious to know what’s happening to me. I really want to know because it’s such a weird thing to have all these incredibly challenging symptoms. *I hate not knowing what is going on...*”.

Mirabai has had no childhood vaccines. In the film she is undecided as to whether she wants to be vaccinated against COVID-19. Since the film was completed Mirabai has booked her COVID vaccination.

LEILA SAWENKO

Mild COVID

On March 6, 2020, just weeks before coronavirus upended the country, an international guest unwittingly infected 42 people at a wedding in Sydney. *Leila Sawenko* (38) and her husband *Tony Maguire* (47), were two of them.

Returning home to Melbourne's inner west, they reunited with their three children, *Bodhi* (9), *Lenny* (7), and *Marley* (6). But they had no idea that they would soon trigger a world first experiment aimed at unlocking the mystery of how children respond to coronavirus.



Image: Sawenko Family. Photographer: Dylan Anderson

Over the next week or so, mild symptoms began to appear. But it wasn’t until Leila received an email from her friends that she realised there was a link to COVID-19. Lisa and her husband Tony tested positive. But all three children tested negative. This was surprising given they were all in such close contact.

One of the great mysteries of COVID -19 is why children appear to less susceptible than adults. This family’s experience sparked a world first study led by *Doctor Shidan Tosif*, from the Murdoch Children’s Research Institute, that shed new light on what is happening in the immune system of the children (see ‘Immunity in Children’ below).

THE CLINICIANS

DOCTOR RUPA KANAPATHIPILLAI

Infectious Diseases Physician – Monash Health

The child of Tamil doctors who migrated to Australia in the 1980s, *Doctor Rupa Kanapathipillai* became involved in global health through work with Médecins Sans Frontières (MSF) in Malawi before completing infectious diseases training in Melbourne. In 2014, shortly after she began working at the prestigious New England Journal of Medicine, the Ebola virus epidemic in West Africa started. Seeing the widespread carnage in some of the



world's poorest countries, *Kanapathipillai* felt compelled to act. She volunteered, and soon arrived at the very front line – working as a doctor in an Ebola treatment unit in Liberia at the height of the epidemic. Although she is now based in New York as an MSF infectious diseases adviser, *Kanapathipillai* typically spends a month over summer in Australia seeing patients in what is usually a sleepy period of the year. The arrival of COVID-19 during her Melbourne stint therefore came as a shock, heightened by the fact that she is now the mother of an eight-month-old baby.

DOCTOR SHIDAN TOSIF

Paediatrician, Murdoch children's Research Institute



Shidan is a consultant paediatrician with a broad experience in managing health issues affecting newborns, infants, children and adolescents. *Shidan* takes a holistic approach to health and enjoys working with families to find solutions that best suit their needs. He has an interest in acute and chronic health issues such as failure to thrive, asthma, eczema and urinary tract infections, as well as travel medicine.

As well as working at the Royal Children's Hospital in Melbourne, *Shidan* holds a research appointment at the Murdoch Children's Research Institute. *Shidan* has worked as a consultant for the World Health Organisation, and with the University of Melbourne.



DIRECTOR'S STATEMENT

Sonya Pemberton

"I think we're in this liminal moment of collectively deciding what we're going to remember and what we're going to forget." Ed Yong, The Atlantic.

As I write this, Melbourne has entered its fourth lockdown. I find it hard to fathom that, after 16 months of making a film about COVID-19, this story just never ends.

171 million people have been infected. Nearly four million have died. And the numbers keep rising. Of course, Australia's COVID story is unlike any other. And, like science journalist Ed Yong, I wonder what we will choose to remember.

Back in early March 2020, as the Australian public started to wake to the story of the new virus emerging in China, I was neck deep in pandemic preparedness mode. I've made many films about diseases, outbreaks, epidemics, and the long-predicted pandemic. Early in my career I spent three years working at CSIRO, making 21 films about emerging diseases. I've since created global documentaries like *Jabbed - love fear and vaccines*, *Vaccines - calling the shots*, and others on viruses and the power of public health.

So as the coronavirus story started to hit the mainstream, shaking hands was out for me, and I'd already updated my medicine cabinet and bought a few extra rolls of loo paper. I was also tracking the case numbers closely, talking to scientists I trusted about what might be heading our way. I couldn't help myself. I recall a sense of dread, but also an odd excitement. Was this really going to happen? Finally?

In mid-March, as Australia locked down, colleagues at the ABC called me. Discussions quickly turned to COVID-19. Did I have any ideas, or angles? All I could think was immunity is going to matter, a lot. And we had one of the most qualified and iconoclastic experts in the field here in Melbourne, Nobel laureate *Professor Peter Doherty*.

Peter was the first person I'd consulted to discuss *Jabbed* years earlier, and we'd stayed in touch. I liked him immensely and was keen to find a way to highlight his vital role in our global understanding of immunity and fighting deadly disease. The original ambition was to help audiences better understand the vast complexity of our immune systems, guided by this funny, clever, much-loved character.

So began months of talking to him about the pandemic, seeking his expert insight and understanding. Given he was approaching 80, he was also in one of the most vulnerable demographics, so he and his wife *Penny* locked down hard and early. Zoom, plus occasional filming through his window, was the only COVID-safe option.

Somewhat naively, I planned to do formal interviews with Peter and all my characters later, when things 'returned to normal'. The Zoom conversations were just research chats. Or so I thought.

I gathered a highly skilled production team - including my cameraman, co-producer and husband, *Harry Panagiotidis*, and acclaimed drama and documentary producer *Lucy Maclaren* - and we set out to chronicle the story of Australia's research response to the pandemic.

The aim was to go behind the scenes, *highlighting in real time* the people responsible for the research, and those impacted by it. Australia clearly has some of the world's experts in infection, immunity and pandemic preparedness. Our film set out to show the public the global contributions made by them, and to highlight the role and significance of science.

We turned to the research institute that bears Peter's name, The Doherty Institute. The team gave me and my crew unprecedented access to the Institute's experts, the weekly leadership meetings on Zoom, and, when restrictions lifted, the building. This intense collaboration spanned a full year, and this remarkable access allowed the film to develop a unique tone and approach.

Of course, I had no idea Melbourne, my hometown, would head into 111 days of lockdown, and that I would not be able to access my characters in person, or film their work, and at times, even leave my home. Nor did I anticipate the extreme exhaustion and inertia of lockdown, the dismal and relentless pressure of 2020.

Making a film about COVID and trying to keep up with the fast and always-evolving science story felt like staring at the sun. It hurt. I longed to look away. I also had no idea I'd end up appearing in my own film. My preference is to stay invisible, tucked behind the scenes, letting my characters do the talking. But I was part of this story, whether I liked it or not. I had to adapt. In so many ways, this was an unexpected journey.

Through the year, my team and I followed several remarkable personal stories of people who had caught COVID-19. We selected three Australians who - I discovered later - each caught the virus in the same fortnight of March 2020: *Leila Sawenko* contracted it in Sydney; *Mirabai Nicholson-McKeller* and *Michael Rojas* caught it in Berlin and South Africa respectively, before heading home. They each had dramatically different outcomes.

From the horror of severe illness and death (*Michael*); to the relentless grind of long COVID (*Mirabai*); to those fortunate to only experience mild illness (*Leila*), each story offered insights into the workings of the virus and our immune systems. And each person generously revealed their very personal, complex and intimate story of what it's actually like to experience this disease.

In late 2020 with my long-standing colleague and editor, *Wayne Hyett*, we started to go through over 200 hours of Zoom chats and footage. The story could go any number of ways. The challenge was to create something that didn't feel like the news, even as it highlighted the news. We wanted to present the facts, the

science, as it evolved; to offer useful insight and understanding; and to capture a sense of this strange and extraordinary time.

A key creative moment occurred early in 2021, when I called Melbourne composer *Dale Cornelius* about creating the music for the film, (*Dale* had previously created the music for our three-part series *Uranium-twisting the dragon's tail*). I had a sense of what I wanted: solo piano, not maudlin but full of dissonance and strangeness. Dale went quiet at the other end of the phone. I thought I'd lost his interest, but then he told me something extraordinary.

From October 2019 he had started an ambitious artistic project – creating a spontaneous piano improvisation every Friday for an entire year. He had filmed his performances to document the process and posted them to YouTube. Little did he realise this creative commitment to *52 Fridays* was about to be influenced by COVID-19.

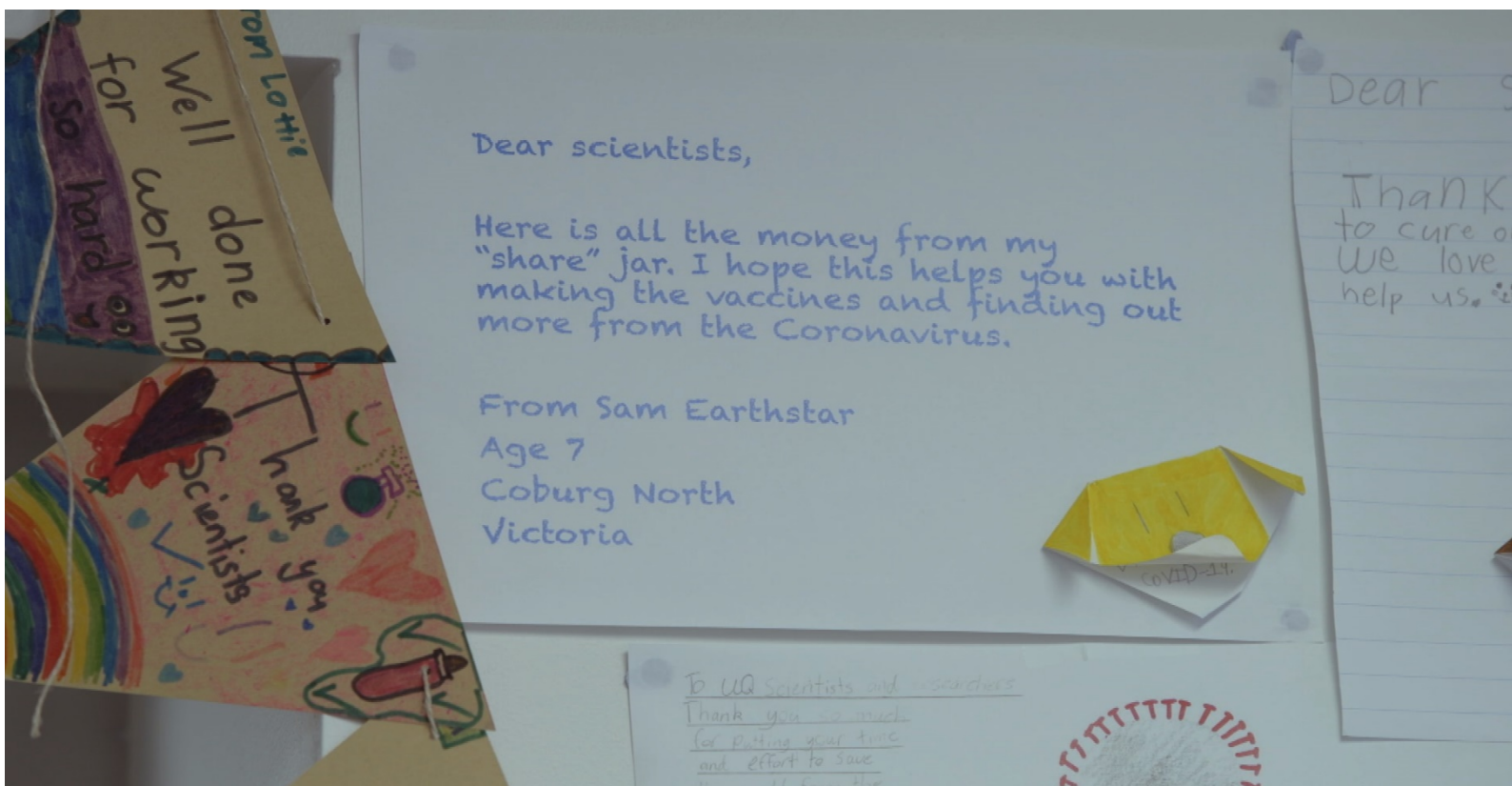
As he shared his story, I had goosebumps. Here was a genuine soundtrack to the pandemic, created in real time, just as our filming of the science response was evolving in real time.

It became clear to me that in so many ways were all improvising. We had to find a way to weave this unique and authentic element into a mainstream science documentary.

What has evolved is a very different film to what I imagined at the start, 16 long months ago. It has become a tender story of hard science, a story that's surprisingly sweet and funny at times, whilst also deeply, profoundly sad. It has become an unusual record of these times, a gentle contribution to collective remembering.

Sonya Pemberton

June 3rd, 2021



CREATIVE TEAM

SONYA PEMBERTON

Executive Producer, Writer, Director, Narrator

Sonya Pemberton, creative director of Genepool Productions, is one of Australia's leading factual television producers specialising in science. 2012 Emmy Award-winner and record-breaking five-time winner of the prestigious Eureka Award for Science Journalism, her passion is quality science programming.



Image: melbournemurals.com.au Title: "Frontline Workers"

Sonya has written, directed and produced over 70 hours of broadcast documentary, her films winning over 80 international awards. She also executive-produced many award-winning factual series and one-off programs, including the 2015 global science-history series *Uranium - Twisting the Dragon's Tail* for SBS, PBS and ZDF/arte.

As a writer and director, her films include the critically acclaimed and multi-award-winning documentaries including the 2013 SBS feature length special on immunisation, *Jabbed - love, fear and vaccines*, followed by *Vaccines - Calling the Shots* for PBS NOVA in the USA. The multi-award winning film *Catching Cancer* was an exposé of viruses causing cancer, and her film *Immortal* which featured the work of Nobel Laureate Elizabeth Blackburn, won the 2012 Emmy award for Outstanding Science programming.

LUCY MACLAREN

Producer



Lucy is an award-winning features and documentary producer. She recently co-produced the feature film 'Miss Fisher and the Crypt of Tears' which premiered at Palm Springs International Film Festival. Over ten years Lucy produced documentaries at Renegade Films including the three-part series for SBS 'Immigration Nation' (a finalist in the Prime Minister's Literary Awards) and the award winning 'Inside the Firestorm', 'Utopia Girls' (a finalist in NSW Premier History Awards and AACTA awards) and 'Subtopia' for the ABC. In 2015 she produced the one-hour documentary 'The Diplomat, the Artist and the Suit' and in 2018 'Aftermath' both for the ABC.

In 2000 she produced her first feature film 'Strange fits of Passion' written and directed by Elise McCredie, which was accepted into Critic's Week at the Cannes Film Festival. This was followed by the highly acclaimed dramatised documentary 'Love Letters from a War'. She has produced several short films including the AFI Award winning 'My Second Car', 'Life Forms', 'Cable' and 'Dragon', which she also directed, all of which screened at the Melbourne International Film Festival.

A graduate from Swinburne Film and Television school, Lucy has been Investment and Project Manager at the Australian Film Commission and Film Victoria and worked as a Line Producer on many feature film projects.

Lucy is currently producing several Genepool projects, including the feature documentary *Carbon - An Unauthorised Biography*, and the upcoming ABC documentary special, *Cracking COVID*.

HARRY PANAGIOTIDIS

Co-Producer and Director of Photography

Harry Panagiotidis has more than 40 Australian and US feature films credits as camera operator, Steadicam operator, and second unit DoP. He also works as Director of Photography on documentaries and factual programs. Married to director Sonya Pemberton, the husband-and-wife creative team thrive on tackling stories of science together. Harry previously shot Genepool's 2013 documentary *Jabbed - love, fear and vaccines*, and the Emmy Award-winning film *Immortal*.



WAYNE HYETT ASE

Editor



Children's drama and documentaries have been specialities for editor Wayne Hyett ASE. His career, spanning nearly 30 years, also includes feature films, adult drama series and documentary dramas for all Australian networks and international audiences. Wayne's documentary highlights include *Captain Cook – Discovery and Obsession*, *The First Fagin*, *Australia on Trial*, *Kindness of Strangers*, *Catching Cancer*, *Vaccines - Calling the Shots*, and the Emmy Award-winning *Immortal*. For IMAX and Giant Screen, Wayne has edited *Hidden Universe 3D*, *Life in Space 3D* and *The Story of Earth 3D*.

His drama credits include *The Castle*, *The Murray Whelan Series*, *Stingers*, *The Games*, *Wicked Science*, *The Elephant Princess*, *Pirate Island* and four series of *The Dr Blake Mysteries*. In 2004 Wayne was awarded accreditation by the Australian Screen Editors Guild "in recognition of excellence in screen editing and outstanding contribution to Australian screen culture".



DALE CORNELIUS

Original Music Composer

Melbourne based screen composer, *Dale Cornelius*, has written music scores for in excess of 200 hours of content, including feature film, short film, animation, television drama, television reality shows, documentary series, and feature length documentaries. His soundtracks have been streamed over 1.7 million times and Dale has been a featured composer on radio shows including ABC Classics FM, Triple R (Film Buffs Forecast) and 3MBS Melbourne.

Dale has scored films officially selected for the following film festivals; Berlin Film Festival, Sundance Film Festival (Mary & Max – opening night film), Tribeca Film Festival, Melbourne International Film Festival, Sydney Film Festival, and Adelaide Film Festival, Cork (Ireland), Telluride (U.S.) and St Kilda Film Festival.

Dale is an Australian Guild of Screen Composers (AGSC) Board Director and Chair of its Education Committee, passionate about bridging the gap between tertiary institutions and the screen music sector, developing opportunities for emerging composers, and creating a vibrant screen music community that is engaged within the screen industry, along with government and peak bodies.

In October 2019 multi-award-winning Australian screen composer, *Dale Cornelius*, embarked on an ambitious artistic project, committing to create a spontaneous piano improvisation every Friday for an entire year. Performances were filmed to document the process and posted to *YouTube*. Little did he realise this creative commitment to *52 Fridays* was about to be influenced by a year as improvised and randomly structured as his performances. The compositions formed during Victoria's lengthy lockdowns became deeply personal artistic responses to events and circumstances beyond Dale's control, as the isolation of his studio began to mirror the world around him.



SOUNDTRACK ALBUM 52 Fridays OUT NOW FEATURING PIANO IMPROVISATIONS

from DALE CORNELIUS' YOUTUBE CHANNEL

"BOOK OF NIGHTMARES"

IMPROVISED AND PERFORMED BY DALE CORNELIUS COURTESY OF NATIVE TONGUE MUSIC PUBLISHING

Tracks

Breathe

Cities & Memory

Transcendence Ephemeral Life Connection Fragmented Memories A Quiet Resolve Radiance

The Dappled Light Of Summer Through The Leaves Searching

Evocations

Release

Awakenings Wind's Telephone Resonating Voices

<http://dalecornelius.com.au/>



SCIENCE BACKGROUND

Are the kids alright? How kids' immune system beats Covid-19.

One of the blessings of the pandemic, is that children rarely seem to get sick and if so, only mildly. Up to one-third of children do not develop symptoms. It has been one of the mysteries of the coronavirus infection, as children were prevented from visiting grandparents and remote-learning was mandated for school children in Victoria's 111-day lockdown in 2020.

The case of a family who presented with COVID-19 in 2020 published in [Nature Communications on the 11 November 2020](#) and a subsequent larger study published in [Nature Communications on 17 February 2021](#), both led by Dr Shidan Tosif, Murdoch Children's Research Institute, shed light on how the immune system of children differs in its response to COVID-19 compared to adults.

When *Leila Sawenko*, 38 years old, and her husband *Tony Maguire*, 47 years old, tested positive for COVID-19 it was a shock. They had attended a three-hour wedding interstate and developed symptoms: a cough, a runny nose, fever and headaches three days later and remained unwell for 11 (father) and 14 days (mother). The boys, 7 and 9 years old also became ill with mild symptoms, but their 5-year-old daughter remained symptom-free.

It was impossible for the parents to physically distance from the children. Swabs were taken from all family members every 2–3 days and symptoms recorded. Despite all the cuddles, kisses and snotty noses, the children repeatedly came back with negative COVID-19 PCR test results from nose and throat swabs, blood, saliva, faeces, and urine. It seemed unlikely, but the results suggested that the parents had not passed the virus onto their children.

So, when their doctor, *Shidan Tosif* discovered immune cells in the same blood (plasma), saliva, faeces and urine samples using a technique called flow cytometry and antibodies against COVID-19 (with an ELISA assay) in the adults and the children, it was a much greater surprise.

Antibodies against various COVID-19 viral proteins were detected in the saliva and blood plasma in both the adults and the children and T cells were detected at significantly higher levels compared to unaffected 'control' participants, as well as cells of the innate immune system called 'eosinophils'. Of the three children, the youngest, who showed no symptoms at all, had the strongest antibody response.

These tell-tale signs of an immune reaction revealed that the children had contracted the virus after all but that their immune response had been so rapid and effective, that the virus could not replicate.

It raises the possibility that immunity in children can prevent COVID-19 infection from becoming established. Also, current routine testing methods may not detect COVID-19 in exposed children.

This discovery led *Shidan Tosif, Richard Saffery and Melanie Neeland* at the Murdoch Children's Research Institute (MCRI) to ask how the immune response of children differed to that of adults.

Dr Shidan Tosif suspected the answer lay in the children's innate immune system, the body's first line of defence against infection. It includes a vast array of different cells.

The MCRI study team looked at the cells in the blood of 48 children and 70 adults who had been infected or exposed to Covid-19 and had presented at the Royal Children's Hospital between April and August 2020. They published their results in *Nature Communications*. The team sought to study the same phenomenon in a larger group of people, as they had seen with the Sawenko-Maguire family.

The infected group had shown symptoms of COVID-19, such as a runny nose, headache, fever, achy muscles and a sore-throat and had a positive PCR test from their nose and throat swab, whereas the 'exposed' group were members of a household with infected individuals, but who had tested negative to COVID-19. All participants in the exposed group had up to five repeat COVID-19 PCR tests at 5-7 day intervals for 4 weeks.

They compared the innate immune system of children and adults during the acute phase of the infection and then again 4 – 7 weeks later. They wanted to know what the innate response looked like; what types of cells were present and how many, at different stages of infection.

They found that exposed children had reduced numbers of certain types of innate immune cells: monocytes, dendritic cells, and natural killer cells. Adults had fewer of one type of cell only: non-classical monocytes. The findings suggest there might be fewer monocytes, dendritic cells and natural killer cells circulating in the blood of children, as these cells may be found located at the sites of infection in the lungs. This is supported by other studies but needs to be investigated further.

However, what was striking was that infected children had higher proportions of innate immune cells called 'neutrophils' that bore a 'CD63' receptor early on in infection (median 22%) relative to exposed children (1.7%). This proportion decreased from 22% during acute infection to 8.1% in recovery, 4 – 7 weeks later. This response was not seen in adults.

Also, in both adults and children there were higher proportions of neutrophils seven weeks after exposure to Covid-19.

The receptor CD63 on neutrophils is involved in the release of cytokines – messenger molecules - as part of the anti-viral immune response. Why are there more of these types of neutrophils in infected children? Could they provide kids with an added advantage in fighting Covid-19? The fact that these cells are still present in the blood over a month later, suggests that they may protect against the virus.

This study was the first in the world to compare the innate immune response of children and adults infected and exposed to COVID-19 and has uncovered differences in the proportions of innate immune cells responding to the virus.

Papers:

1)

Immune responses to SARS-CoV-2 in three children of parents with symptomatic COVID-19.

Shidan Tosif, Melanie R. Neeland, [...]Nigel W. Crawford.

Nature Communications volume 11, Article number: 5703 (2020)

Link: <https://www.nature.com/articles/s41467-020-19545-8>

2)

Innate cell profiles during the acute and convalescent phase of SARS-CoV-2 infection in children.

Melanie R. Neeland, Samantha Bannister, Vanessa Clifford, Kate Dohle, Kim Mulholland, Philip Sutton, Nigel Curtis, Andrew C. Steer, David P. Burgner, Nigel W. Crawford, Shidan Tosif & Richard Saffery.

Nature Communications volume 12, Article number: 1084 (2021)

Link: <https://www.nature.com/articles/s41467-021-21414-x?fbclid=IwAR1V-WOKoCnZL5KAfxlAtxLiBM8qoBcVzTtN2mD7303kTbZdg59YXkn1DyM>



Image: Lenny, Bodhi and Marley Sawenko. Photographer: Dylan Anderson

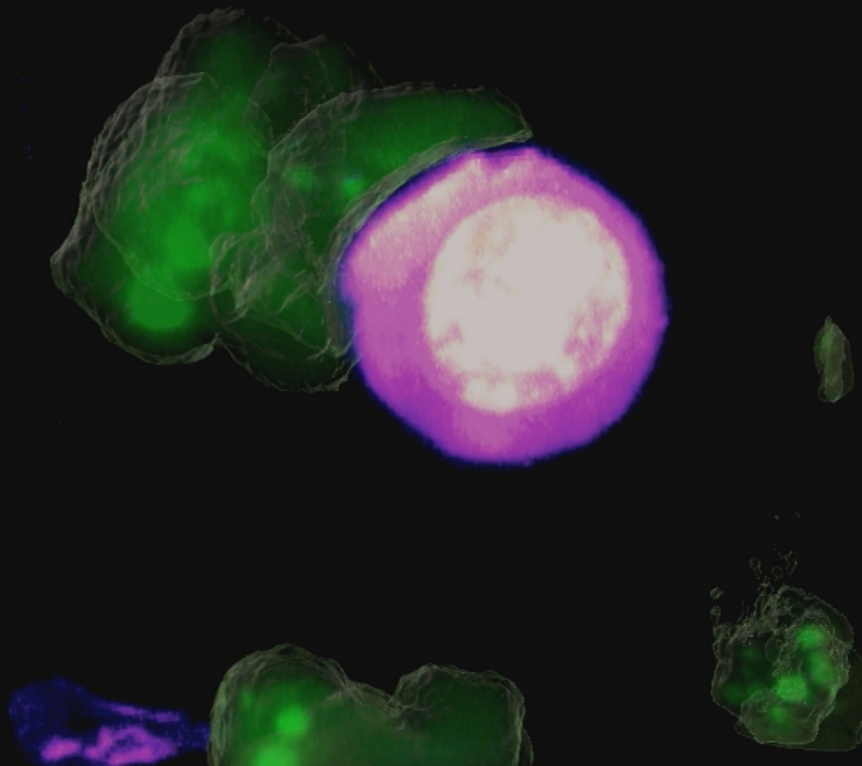


Image T Cells captured by AProf Misty Jenkins at the Walter and Eliza Hall Institute of Medical Research. © WEHI

T CELLS

These are real Killer T cells, imaged by *Misty Jenkins, Kylie Luong* and team at WEHI specifically for *CRACKING COVID*.

Killer T-cells patrol our bodies, hunting virus-infected cells. They attach to the surface of cells, scanning for signs of infection. When they detect that a cell is infected, they deliver a lethal hit, in the form of toxic proteins that get delivered to the diseased target cell. This causes the infected cell to undergo programmed cell death. Then the T cell then detaches and continues monitoring other potential targets as the T cells have the capacity to be serial killers.

Misty Jenkins describes how these remarkable images were captured, what this resource means for the scientific community, and how having this imagery will enable scientists and the broader public better understand T Cells and how they work.

To create these images, the T cells are cultured and labelled with a green dye that flashes bright when it recognises a diseased target cell. The T cells are then mixed with target cells in a small dish and placed on the stage of a microscope. Also in the media is a red dye that enters the diseased target cell once it has been 'hit' by the T cells. A camera takes an image every ten seconds and we stitch them together to make the moving image.

Visualising the T cells delivering their toxic payload to the diseased cell can teach us a lot about the process. We can learn all sorts of things by studying the various parameters like how long the diseased target cell takes to die and how long the T cell takes to kill or by measuring how long the T cell stays attached to the target. All of these parameters can have a consequence for our immune system and tells us about how efficient the process is, like how many diseased targets can be killed by one T cell.

Having this visualisation can help us design better treatments by knowing exactly how the immune cells can impact a target cell and how we can make the process more efficient.

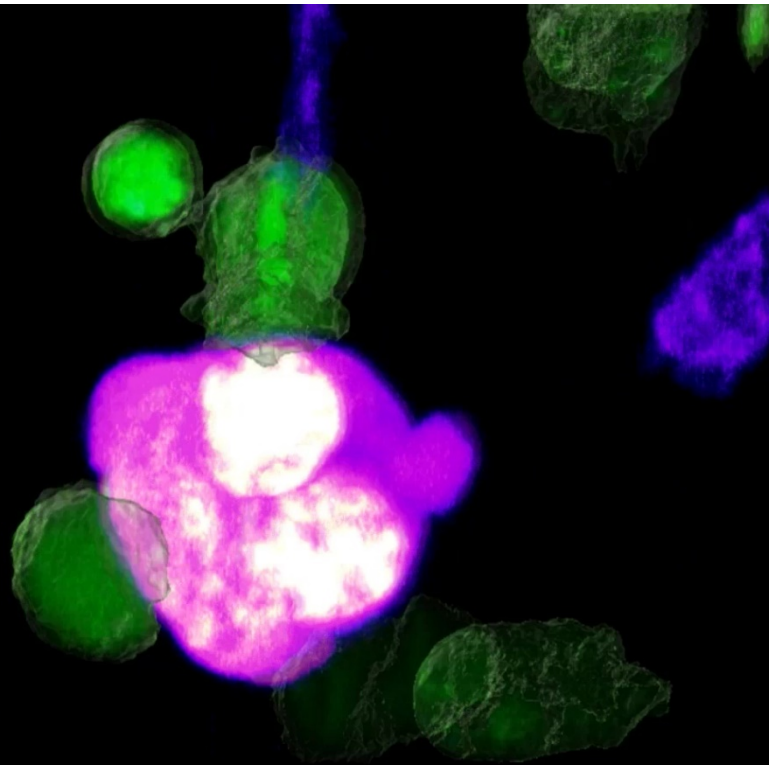


Image T Cells captured by AProf Misty Jenkins at the Walter and Eliza Hall Institute of Medical Research. © WEHI

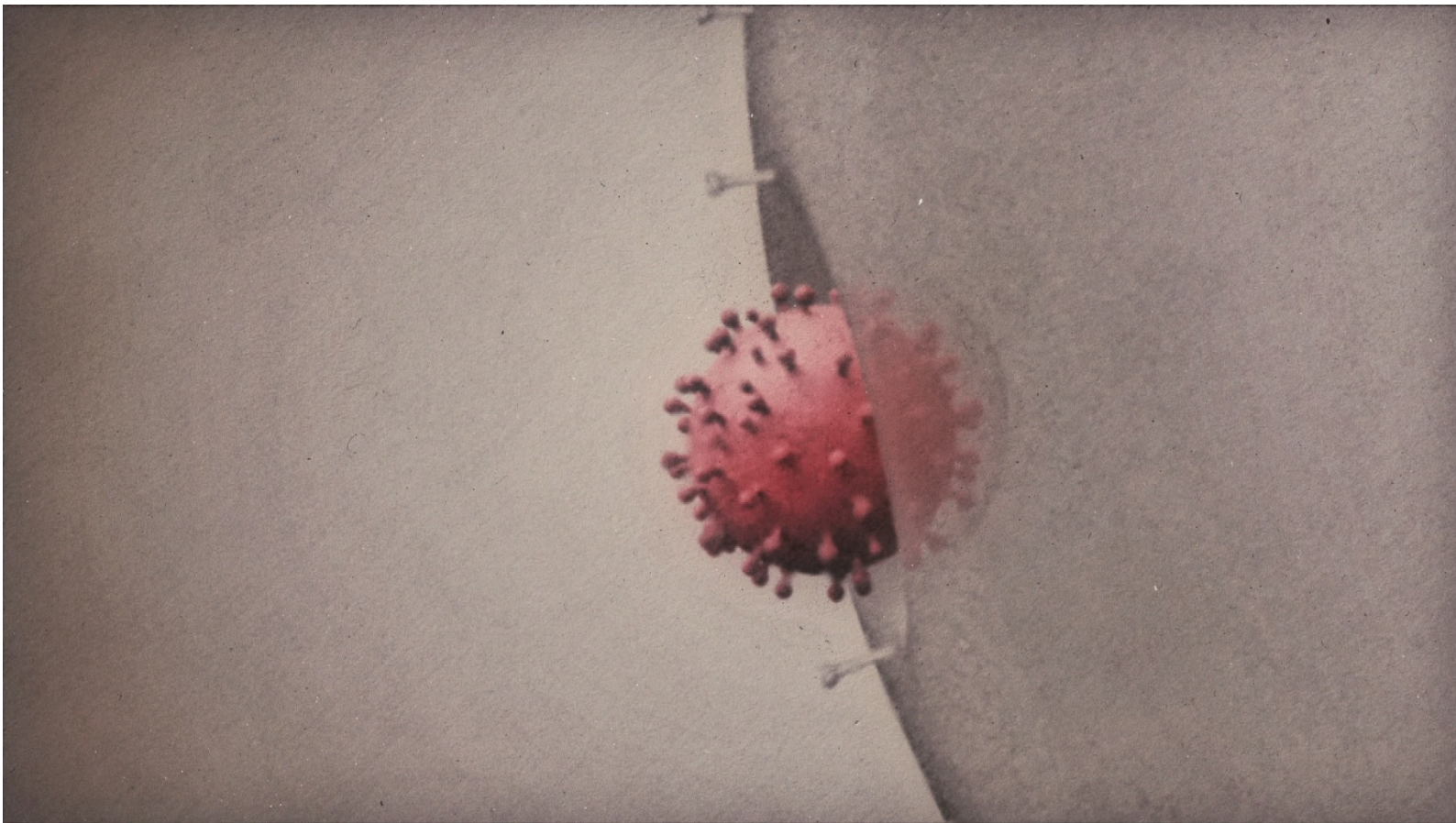
ASSOCIATE PROFESSOR MISTY JENKINS

Immunologist, Walter and Eliza Hall Institute



Misty Jenkins is a NHMRC fellow and laboratory head in the Immunology Division at Walter and Eliza Hall Institute for Medical Research, where she researches cellular immunology and cancer immunotherapy. Misty studied her PhD in Immunology at The University of Melbourne, followed by postdoctoral positions at The Universities of Cambridge and Oxford, and The Peter MacCallum Cancer Centre in Melbourne. Misty has a long-standing interest in

CD8⁺ T cells and her research program researches the use of T cell immunotherapy for brain cancer. A/Prof Jenkins was awarded the L’Oreal for Women in Science Fellowship (2013), was Tall Poppy of the year (2015), was awarded the Westpac/Australian Financial Review Top100 Women of Influence award (2016). In addition to her research career, A/Prof Jenkins is experienced in governance and is a Board Director for Monash Health, Co-Chair of the Indigenous Health Medical Research Future Fund.



EXPERT CONSULTANTS

ASSOCIATE PROFESSOR IAN M. MACKAY, Virologist, University of Queensland

DOCTOR SHALIN NAIK, Cell Biologist, WEHI

PROFESSOR SAMMY BEDOUI, Immunologist, Doherty Institute

PROFESSOR BRIAN J ZIKMUND-FISHER, School of Public Health, University of Michigan



Image: Peter Doherty outside The Doherty Institute. Image by The Doherty Institute

PETER DOHERTY'S IMPACT ON THE LIVES AND CAREERS OF EXPERTS

Professor Sharon Lewin AO

I first met Peter in the early 2000s. He had recently returned to Australia and was working part time at the Department of Microbiology and Immunology at the University of Melbourne and St Judes Memphis. I was a junior laboratory head in the same department, just embarking on an independent research career in HIV research.

He attended my farewell morning tea in 2003, as I was moving to the Alfred to take up a pretty significant leadership position as the head of the Department of Infectious Diseases. I remember him saying to me that he knew I would make a tremendous head of department but hoped my time south of the Yarra would be for just a short time and I would soon return to University of Melbourne. I recall being a bit star struck, that someone like Peter even knew who I was, let alone was encouraging me to eventually return! In an unexpected turn of events, the Doherty Institute was turned from a dream into a reality and I returned as its inaugural director in 2014. I have since worked with Peter very closely as our patron and having that rather significant burden of making sure we do his great name the justice it deserves!

Over the past 7 years since leading the Doherty Institute, I have immensely enjoyed the opportunity to work so closely with Peter. He is a remarkable man – not just for his intellect and humor (which always keeps us laughing) but for his humanity, curiosity and warmth. He has given me personally and the institute endless time and encouragement, without ever interfering. He has trusted me to lead and provided unwavering support. I hope he has enjoyed the spectacular journey and success of the Doherty Institute as much we all have!

Professor Katherine Kedzierska

I have been very privileged and extremely fortunate to be trained by Peter during my postdoctoral years. Peter was, and still is, the most wonderful and inspiring mentor anyone could wish for. Through his scientific brilliance, Peter has not only taught me how to do research but also shared his pearls of wisdom on how to think outside the box, work in a group situation, ask key immunological questions, follow the exciting data, and then creatively write it all up as a scientific story. Peter guided me through my journey to independence. He provided support for my human immunology program, encouragement, invaluable advice and important tips like “make sure you write every day...never lose your enthusiasm... and no matter what happens, do not become bitter”. Sometimes I wonder what kind of researcher I’d become if I was not trained by Peter. And, I know, for sure, that I would not be where I am now, doing research I love doing in a way that I am doing it. I would like to thank you Peter immensely for all your mentoring, inspiration and guidance over the last 18 years.

Associate Professor Misty Jenkins

Peter recruited me as a PhD student, and together with Professor Stephen Turner trained me at The University of Melbourne. For a girl from Ballarat, I found Peter’s inclusiveness striking. He would tell us, “science is the ultimate meritocracy, it’s focus and ability that counts, not meritocracy or connections”. He would tell us to think deeply about and ‘commune with’ our data. I fell in love with Immunology and Peter taught me how to think critically and design a well-controlled experiment, but also how to read a paper, how to write, how to present and how to make our science accessible to the public. He is passionate for science communication and ultimately being accountable to taxpayers who fund most of the medical research in this country. He taught me that as scientists we all have a deep responsibility to contribute to increasing the scientific literacy of our communities. His broad research program was inspiring and I will always be grateful for his wise leadership and friendship.

Professor Paul Young

I first met Peter at a small specialist meeting in Hamburg in 1986. Like everyone else at that meeting, I knew of the work that he and Rolf Zinkernagel (who was also at that 1986 meeting) had published some 10 years earlier and that would ultimately lead to their joint Nobel Prize in 1996. Their revolutionary work that changed our fundamental understanding of the way our immune system recognises foreign invaders made them the stars of the meeting. But as he has shown throughout his career, that fame fell lightly off his shoulders. He was engaging and generous to this younger fellow graduate of the University of Queensland. He was always a great communicator of his science to fellow scientists, but what has been a real delight to witness over the last decade or so has been his transition as a powerful science communicator to the wider community. He has written six books and countless blog and media articles, all articulating his passion for a wide range of topics, most notably climate change. Over the last year he has brought sage and wise advice on all matters COVID-19. Peter is the embodiment of an Australian national treasure.



USEFUL WEB RESOURCES

More information about the program including expert blog articles, bonus videos, links to additional web resources and an education kit is available on the **Genepool Productions** website:

genepoolproductions.com/crackingcovid

Other social media links:



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ANIMATION AND VISUAL EFFECTS DOM BARTOLO, 21-19

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