Catching Cancer

Viruses can cause cancer.
And, believe it or not, that’s good news.

(Prof Ian Frazer stops a cancer-causing virus in its tracks)

1 x 55 minutes HD
A December Films & Pemberton Films Production
Screening on ABC1 Thursday 22 October at 8.30pm

PRESS KIT
SYNOPSIS

One Line Synopsis

Viruses can cause cancer. And, believe it or not, that’s good news.

Short Synopsis

One in three of us will get cancer at some stage in our lives. From the moment of diagnosis the common cry is “why me?” Now, across the planet, a select group of scientists is hunting cancer-causing infections. Startling new evidence is revealing that viruses and bacteria are triggering some of the biggest killers of our time. And, believe it or not, this is good news.

Long Synopsis

One in three of us will get cancer at some stage in our lives. From the moment of diagnosis, the common cry is, ‘why me?’ We blame our genes, our environment and our lifestyle, but could we be overlooking another crucial cause of cancer?

In Australia, a mysterious cancer cluster has led to an unusual investigation. Sixteen women working in one workplace have developed breast cancer. The majority are young, none have a family history of the disease and no environmental cause has been found for the illness. A team of scientists has begun to investigate if the cause could be a virus. It is a controversial idea, with extraordinary implications.

In the United States, researchers are hunting a virus that triggers breast cancer in mice and asking, could it spread to people?

In the United Kingdom, childhood leukaemia is under the microscope and infection is the prime suspect.

20% of all cancers worldwide are caused by infections. Now, across the planet, new evidence is emerging that links viruses and bacteria to an increasing number of cancers. Should we be worried? Does this mean we could all ‘catch’ cancer?

In Germany, clever detective work by Prof Harald zur Hansen solved the deadly riddle of viruses causing cervical cancer and, in 2008, won him a Nobel Prize.

In the beautiful islands of Vanuatu, a medical revolution is underway - the roll-out of the world’s first vaccine specifically engineered to stop a cancer.

Featuring world experts, Nobel Laureates and virus hunters on the front line, Catching Cancer is a fast-paced investigation of a provocative idea. Voyaging deep into the mysterious cellular world of cancer, the film demonstrates how cancer begins and what factors rig the ‘cancer lottery’s’ lethal odds. Combining intimate personal stories and intriguing science, Catching Cancer reveals how finding a hidden trigger, such as a virus, is not a reason to panic; it’s a reason to celebrate.
PROGRAM OUTLINE

Lisa Backhouse was one of sixteen women who developed breast cancer while working at the ABC Television Studios in Brisbane, Australia. Many were young women and none had a family history of the disease. Lisa was a happily married, successful news-reader and mother of two, and the disease turned her life upside down.

The possibility that this particular cluster of cancer was pure coincidence is literally one in a million. The entire site was evacuated in December 2006 but so far, no one has been able to find an environmental cause, or any other kind of trigger that may explain it. Solving the mystery of this unique cluster may reveal the truth behind what really causes breast cancer.

Finding the cure for cancer has long been the holy grail of medical science, but finding the cause offers us the chance to arrest it, before cancer’s epic journey even begins. A controversial hypothesis has been proposed by Brisbane pathologist, Dr Glenn Francis; that this rare cancer cluster may have been caused by a virus.

Dr Francis meets the women from the ABC offices and studies their medical data in his lab. His hypothesis may seem provocative but he is not alone; around the world other scientists believe that following the trail of infections may transform our understanding of how cancer operates.

In London, leading cancer researcher Professor Mel Greaves, has spent decades investigating why cancer strikes, and how viruses can be involved. The fascinating cellular landscape comes alive through digitally enhanced motion graphics. Up close, we can see a perfectly formed cell, growing, multiplying and dying as it should. But some cells don’t function properly; they refuse to die, instead reproducing and sometimes growing large enough to cross tissue boundaries – a process known as metastasis – which is cancer at its most dangerous. By understanding how cancer begins we can see that it is not an alien invader but rather a single one of our own cells that has become corrupted and no longer listens to the body’s signals. The billion dollar question is what causes things to go so terribly wrong?

The discovery of cancer causing genes - the oncogenes - stole the scientific spotlight in the 1970s. Since then, scientists have turned to advances in DNA research for answers, but American evolutionary biologist, Professor Paul Ewald reminds us that genetics is only one part of the cancer story. Ewald argues that viruses are critical in sparking the spread and growth of cancer and believes it’s time to look more closely at the role infection plays in the story of cancer.

In 2008, Professor Harald zur Hausen was honoured with the Nobel Prize for Medicine, but in the 1970s, his hypothesis - that a common wart virus caused cervical

Prof Harald zur Hausen, winner of the 2008 Nobel Prize for Medicine

- 2 -
cancer, was met with scepticism and some hostility. Ignoring his critics and struggling with the technical limitations of the times, zur Hausen persevered with his pioneering research. Nowadays, his ground-breaking discovery, that cervical cancer is caused by the Human Papilloma Virus (HPV), is changing lives.

In Vanuatu, behind the stunning vistas of these tropical islands lies a dark secret; one in ten women in Vanuatu develops cervical cancer. Like Marie Galeb; she is 45 and dying of cervical cancer. But today, knowing that a virus is to blame for the cancer, there is hope for the next generation of women of Vanuatu. If we can stop the virus, we can stop the cancer even starting. Working with colleagues around the world, Australia's Professor Ian Frazer has developed a vaccine to prevent HPV infection. Over time this will hopefully stop the spread of cervical cancer, which affects half a million women worldwide every year.

Today Frazer and his team are in Vanuatu to roll out the new vaccine. But there are challenges. Young girls must be vaccinated before they become exposed to the virus that causes cervical cancer. Frazer has just three days to train up a local vaccination team, and, to help educate the communities. He must make it clear that while the Human Papilloma Virus contributes to causing cancer, it alone is not enough to ensure that a person develops cancer. There are other factors involved.

Back in Brisbane, Dr Glenn Francis is open to the possibility that the ABC cancer cluster may reveal evidence of the Human Papilloma Virus. It would answer a lot of questions but, so far, there is no hard evidence to prove the theory.

For Professor James Holland in New York, clues to the puzzle of what causes breast cancer lie in the animal kingdom. Holland strolls through a pet store and stops to look at a mouse running on a treadmill. In the 1930s, scientists studying mice with breast cancer discovered the trigger was MMTV - the mouse mammary tumour virus. Another clue lies in geography: Holland gazes down at a CGI world map, there is a noticeable similarity between the areas with a high distribution of breast cancer and the prevalence of the common house mouse (mus domesticus). Could women catch breast cancer from mice?

This controversial question divides the scientific community. Molecular biologist Professor David Vaux, from La Trobe University, Melbourne, vehemently rejects this idea. In Sydney, Professor Bruce Armstrong remains sceptical but admits that stacked up together, the research is intriguing. Back in Vanuatu, as he struggles through the jungle to reach a remote village, Professor Ian Frazer reminds us that for every person who thinks outside the box and gets it right, there are a hundred others who get it very wrong.

There are no promises when you venture beyond the frontiers of accepted scientific research. But the search for answers, no matter how controversial, is championed by people like Lisa Backhouse, struggling with the personal consequences of cancer. She fervently hopes that scientists can find a cure for breast cancer soon, so that no one else will ever have to go through what she and hundreds of thousands of other women have suffered. A breast cancer vaccine, like that for cervical cancer, would be a great breakthrough.
But even with a vaccine, stopping cancer is no simple business. In Vanuatu, Professor Ian Frazer approaches a group of women and their children who regard him with scepticism, they are not immediately willing to trust that his vaccine will protect them against cervical cancer. The vaccination program will not proceed today…but as Frazer states, this small rural community is right to be asking questions.

Everywhere, people just like those in Vanuatu, struggle to protect themselves against cancer. Yet every year, over ten million people across the globe are diagnosed with cancer. What is it that makes us so vulnerable?

The answer lies in our DNA. Every one of us has millions of cell divisions every day; this constant process of repair and renewal is essential, allowing us to evolve and adapt to our changing environments but it also increases the chances of things going wrong.

In many ways, developing cancer is rather like playing the lottery. Professor Mel Greaves pulls the handle on a gaudy slot machine to illustrate the metaphor. We need a number of mutations – thought to be between three and 12 - over a period of time to get cancer. There are a variety of factors that contribute mutations, including genetics and lifestyle. One critical variable is infection with cancer-causing viruses, still another is the random genetic mutation in our own cells.

In suburban London, Samantha and Paul Cowpe have identical five year old twins, Tomas and Daniel. They snuggle on the couch as their parents read to them a book telling the story of a child with cancer. Five months ago, Tomas was diagnosed with acute lymphoblastic leukaemia. But if both children have the same genes, why did only one brother develop cancer?

It all comes back to the combination of variables, the lethal ‘lottery’ of cancer. Knowing that acute lymphoblastic leukaemia is caused by at least two DNA variables or ‘hits’ has real benefits. Daniel, the healthy twin, has had the first genetic mutation in the womb. Now the doctors can be ready, if there’s a second hit.

Back in Brisbane, Dr Glenn Francis and his team are analysing the preliminary test’s results from the ABC breast cancer patients. There’s no concrete evidence, but there are hints. In Perth, West Australia, tantalising hints were the trademark of another hugely successful medical investigation.

Professor Barry Marshall, Nobel Laureate for Medicine in 2005, chats to a group of children in Kings Park, Perth. Using a long pink balloon to illustrate his point, he explains that helicobacter is a stomach germ that causes indigestion, acid problems and ulcers and over many years it can sometimes lead to stomach cancers. The children are fascinated.

Marshall’s findings were just as fascinating to the global scientific community. His discovery has meant that stomach cancer (once one of the biggest cancer killers on
earth) can now be avoided via antibiotics, to the benefit of millions of patients. We witness Marshall accepting his 2005 Nobel Prize. He is yet another scientist brave enough to challenge the accepted wisdom to discover new truths.

Although humans can’t ‘catch’ cancer in the same way that we catch colds, we can catch the infections that trigger cancer. The Tasmanian Devil is one of the few animals that actually ‘catches’ cancer. In an animal hospital in rural Tasmania, a researcher nestles a Tasmanian Devil in his arms and assesses the marsupial for a rare, contagious form of cancer. In this instance, the cancer cells themselves spread the disease.

Unlike Tassie Devils, infections only have the potential to contribute to a human developing cancer, in conjunction with other risk factors. And many of these human infections can be prevented. This knowledge drives Professor Ian Frazer and the vaccination roll-out in Vanuatu. Eradicating a major disease takes immense reserves of energy, time and money. But for now, with his work in Vanuatu done, he leaves the job in the capable hands of the Vanuatu locals.

Back in Brisbane, Dr Glenn Francis is still no closer to determining what caused the abnormal cluster of cancer in the women working at ABC. But he will not give up. A negative study is not necessarily a bad thing. The persistence of cancer requires persistent researchers. He is a virus hunter, and the hunt can take decades.

And with 20% of all cancers proven to be triggered by infection, a new generation of virus hunters are on a mission to find the link between different forms of cancer and infection. Top of the list are infectious causes of skin cancer, prostate cancer, lymphomas and leukaemia, brain and lung cancers. Professor Ian Frazer argues that every cancer needs to be scrutinised for potential viral and infectious causes.

One in three of us will get cancer at some point in our lives. From the moment of diagnosis, the common cry is, ‘why me?’ Today we know that cancers are caused by the interplay of multiple agents: a potent mix of genetics, lifestyle and environmental triggers. And a key aspect of our environment has always been infections.

Discovering that infections are also cancer ‘triggers’ is not a reason to panic, rather it’s a reason to celebrate. It means that we have the power to act; with vaccines, antibiotics and improved hygiene, we have new power to prevent and control cancer.
BACKGROUND INFORMATION

Why This Film? Why Now?

The statistics are daunting. One in three of us will develop cancer, and all of us know someone with cancer. Globally, some 25 million people live with the disease, and by 2020, cancer may be killing over 10 million people per year.

With breakthroughs and cures always just around the corner, the statistics - and with them our scepticism, continue to grow. It can often feel like we are losing the battle.

There have however been significant and exciting advances. Marvellous new tools – in genetics, molecular biology, cellular imaging - are revealing some of cancer’s dark secrets, and we are discovering we are far more than our genes. Critically, for the first time in history we have a real understanding of what cancer is, how it works and why it has evolved to plague us. And the more we know about its nature, the better we can protect ourselves and fight back. In today’s world, we can witness the ‘cancer lottery’ in action, and play a significant role in stacking our own odds.

The current trend in fighting cancer is to focus primarily on diet, lifestyle, environment and genetics. Another significant area of investigation, the role of infections, largely went out of scientific fashion in the early 1980’s. Over one billion dollars was spent hunting viral cancers in the 1960’s and 70’s, but the results were disappointing. The technology of the time failed to discover the big viral ‘answer to cancer scientists had been searching for. And with the discovery of cancer causing genes – the oncogenes - during the same period, genetics took over as the great new hope.

But recent advances in viral science, and new molecular genetic technologies, have led to a resurgence of interest in cancer-causing infectious agents. A select group of distinguished scientists is recommending that it’s time to look again – to use the new tools available to us to seek new cancer-causing infectious agents.

The World Health Organisation states that approximately 20% of cancers worldwide, are due to infections. Hepatitis B viruses cause liver cancer; human papilloma viruses (HPV) cause cancer of the cervix, and Helicobacter pylori is the trigger for stomach cancers. Cancers can be ‘caught’, but perhaps not quite in the ways we imagine.

New infectious agents are also now being investigated for potential links with some form of leukaemia and lymphoma, certain brain cancers and skin cancers, prostate cancer, colon cancer and one of the biggest killers of women, breast cancer. The jury is out on causation, but the hunt for infectious triggers is well and truly back on.

As the world’s first cancer vaccine is rolling out across the world, hundreds of thousands of young women line up to be injected with the cervical cancer vaccine. In many places there is much misinformation, distrust, and fear of this new vaccine. Few people realise that one of the great successes in the war against cancer is playing out, right now.

The holy grail of medicine has long been to cure cancer.

And now, an old idea is being made new; today’s challenge is to prevent Catching Cancer.
What is Cancer?

“Cancer is not an alien invader.
It’s a single one of our own cells, gone terribly wrong.”

Nearly every cell in our body replicates and, eventually, dies. The body signals cells to die - when their time is up, or if their DNA is damaged. This regulated cell suicide is called apoptosis – and it’s normal.

When a cell does not behave by the rules, begins dividing uncontrollably and fails to die, then you get a cancer. Cancer is, in effect, a sociopathic cell; an immortal cell, growing out of control.

Cancer is a disease of the genes. Something corrupts a cell’s DNA, and triggers a mutation. A mutation in the genes that control the process of cell division can have disastrous results. But it usually takes more than one “hit” or injury to cause a cancer. Often it takes multiple DNA injuries, over time, to trigger cancer starting.

People can have a predisposition to cancer. That means that they already carry a mutated gene in their DNA, which was inherited from their mother or father. This heightens their risk of developing cancer. For example, 5% women carry a mutant BCRA1 or BCRA2 gene, which can make them high risk candidates for breast cancer. However, then there are a number of genes that are more common which also contribute to the risk of breast cancer.

The environment & lifestyle can also play a major part: UV rays from the sun, carcinogens such as cigarette smoke, asbestos and other toxins, poor diet and infections, can cause mutations in genes that can lead to cancer.

Infectious agents, such as viruses, bacteria and parasites rank only below tobacco and diet as a common cause of cancer.

These factors (and ‘hits’) can accumulate over a person’s lifetime and so the likelihood of developing cancer increases with age.
DIRECTOR’S STATEMENT

My mother had cancer during 2001. I spent precious hours by her side as the unravelling of life took place. Her cancer was a rare form of leukaemia and she had spent a decade working with leukaemia patients. As I stroked her face, I wondered if there was a link, if there was any way she might have ‘caught’ this cancer. She was 58 years old when she died, and I miss her like breathing.

I have compelling intellectual reasons for making this film – and a history of enquiring into science. I also have a personal commitment to telling this tale, in a particular way.

After my mother’s death I started to read. I discovered how viruses were linked to animal cancers 100 years ago and linked to human cancers 40 years ago; how germs like hepatitis B and C were known to lead to cancers; and yet how deeply unfashionable it was to explore those links today. Viral causes of cancer had gone out of scientific fashion in the 1980’s, overtaken by a global preoccupation with the remarkable possibilities of genetics.

Five years ago, in 2004, when I first pitched an idea for this film to various broadcasters I was told the idea was “too speculative”, and “too controversial.” The response was a deep scepticism. It would take two Nobel prizes to convince anyone to take the idea seriously.

In 2005, I celebrated when Barry Marshall and Robin Warren won a Nobel Prize, for proving a bacterium triggered gastric cancer (and I executive produced an award winning film for the ABC called Winners Guide to the Nobel Prize); and I marvelled as Ian Frazer launched the cervical cancer vaccine in 2006.

Then the ABC breast cancer cluster exploded in the Australian news in late 2006 - over a dozen, mostly young women with breast cancer, most working in the same room. It was extraordinary. When the case was closed despite no cause being found, I felt the questions arise once again. Could a virus be to blame for this uncanny ‘outbreak’ of breast cancer? It seemed an outrageous idea to even contemplate.

Several months later I read an article online; a Dr Glenn Francis, in Brisbane, was reopening the ABC breast cancer investigation and he was going to look for viruses. I was literally dialling his number as I finished reading the story. We discussed following his investigation on film. He was open to the idea, if understandably hesitant. He knew it was very controversial. He didn’t expect to find anything; he just wanted to exclude the possibility of a virus, if he could. In early 2008, we began preliminary filming - although my producer Tony Wright and I still struggled to get production funding for the film.

But then last year, in late 2008, Prof Harald zur Hausen won the Nobel Prize for Medicine, for proving that cervical cancer is caused by a virus. Two Nobel Prizes in the past five years, both proving infectious agents trigger cancers – surely now the question of infections causing cancer had to be taken seriously. New technology, new approaches
and new understanding were coming together, and old ideas were being looked at, afresh. We received our production funding.

To tell the story of infections causing cancer, I had to understand cancer itself. What is it? How does it work? I started to learn of the multifactorial process, the chain of events that lead to cancer. By understanding the actual steps that cancer takes on its mutant marathon, the more I began to feel there was some sense of control. I couldn’t alter my genes but I gave up smoking (after 20 years!) and I changed my diet. I am learning to stack my own odds…

I was deeply aware that the subject of cancer could be a ‘turn off’ for many viewers. As such a great deal of effort has been spent making sure the film is accessible, fast moving, with an uplifting edge. A key element was the use of beat box styled music. All the music was created ON the human body - there are no instruments, only layers of human voice and body percussion. Composer Peter Dasent (Heavenly Creatures) and vocal looper Darren Percival created the unique and evocative soundscape driving the film.

Another key element was the cinematography by Harry Panagiotidis; the film was planned to be a thing of beauty, placed in the real world - and the laboratory - with elegance and grace. The intention has been to ensure the journey with this challenging subject would be a pleasurable one.

And as we explored the science, I forced myself to remember the pain, fear and sorrow that cancer brings, for both the patient and those who love them. Every cancer is the story of life, love and, sometimes, loss. Communicating both the intimate heart of cancer and the thought-provoking science, in a way that could be uplifting, inspiring even, has been the dream.
PRODUCTION INFORMATION

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KEY CREATIVES

SONYA PEMBERTON
Writer/Director/co-Executive Producer

Sonya is one of Australia’s leading science documentary writers, directors and executive producers. She has written and directed over 40 hours of television, specialising in science documentary for an international market. Her films have won over 30 awards and she has been three times honoured with the prestigious Eureka Prize for Science Journalism (2003, 2004, 2008). Recent credits include “Angels & Demons, with Andrew Denton”, on mental illness. And as executive producer on ‘Crude’ the multi award winning story of oil.

TONY WRIGHT
Producer/ Executive Producer

Tony Wright is an award winning and highly experienced producer in documentary, drama and children’s television production. He has worked in all these areas with the commercial networks, the ABC and SBS in Australia as well as the BBC and Nickelodeon in the UK and other European broadcasters. His credits include: Plasmo (international co-pro), Li’l Horrors (internationally financed), Grey Voyagers (international co-pro) and Revealing Gallipoli (international co-pro). Tony largely functions in the company as the hands on producer. Most recent credit is a Supervising Producer of the recent Australia/Canada Treaty co-production Captain Cook: Obsession and Discovery.
**PETER DASENT**
Composer

Peter Dasent has been composing music for film and TV for over 20 years. He is best known for scoring three of Peter Jackson’s early features (Meet The Feebles, Braindead and the Academy Award nominated Heavenly Creatures), and Gillian Armstrong’s Not Fourteen Again.

For television he has specialised in children’s drama and animation (mostly recently Zigby for ABC-TV), and documentaries, including Sonya Pemberton’s 2007 film Angels and Demons. Other recent doco scores have included Race To The Beach (SBS/BBC 2007), Fine Line (SBS 2003) and Rough Justice (ABC 2002).

He has been the resident pianist and musical director for ABC-TV’s Play School since 2000 and is the songwriter and producer of the highly successful children’s CDs I Like To Sing and Songs To Make You Smile by Play School presenter Justine Clarke.

**WAYNE HYETT**
Editor

Locally produced Children’s drama and Documentaries have been a speciality for editor Wayne Hyett A.S.E. His career, spanning over 24 years, also includes Feature films, Adult drama series and Documentary dramas for all Australian Networks and International audiences. Drama credits include The Castle, The Murray Whelan Series, Stingers, The Games, Wicked Science and Pirate Island. His Documentary highlights include The Kindness of Strangers, the major ABC series Captain Cook – Discovery and Obsession, and Once Bitten.

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”.

**HARRY PANAGIOTIDIS**
Director of Photography

Harry has over 40 Australian and US feature films credits as camera operator, Steadicam operator and/or 2nd unit DOP. He also works as Director of Photography on documentaries and factual programs. Married to director Sonya Pemberton, this husband and wife creative team thrive on tackling stories of science together.
MAJOR CHARACTERS

PROFESSOR IAN FRAZER (AUS)
Director Centre for Immunology & Cancer Research
University of Queensland

Professor Ian Frazer

"I've been given a few titles over the past couple of years. My children's favourite
was in the Weekend Australian – a story about the vaccine, a picture of me, and
the headline “God's gift to women”. Of course it was the vaccine they were talking
about and I've had to point out to my children that this is not a hereditary title.

Perhaps the one that brought me down to earth was a similar story in
Cosmopolitan magazine – another story about the vaccine with a picture of me,
and the headline “the little prick that may save your life”! It's as well to be
reminded of some realities."

Professor Ian Frazer's speech on being awarded the Prime Minister's Prize for Science,
Thursday, October 16, Parliament House, Canberra

Born in Glasgow Scotland in 1953, Ian Frazer was the eldest son of a biochemist and a
medical researcher. He graduated with medical degrees from the University of Edinburgh
having trained as a kidney specialist and immunologist. He then migrated to Melbourne,
Australia in 1981 to work at the Walter and Eliza Hall Institute of Medical Research.

Ian still kept up clinical practice while in Melbourne and it was there he saw men infected
with HIV presenting with rare cancers that had no obvious cause. These patients began a
line of enquiry that has dominated Ian Frazer's career and have led to the first vaccine to
protect against cancer.

"My entire career has been focused on understanding the interaction between
papillomavirus and the cancers they affect," Prof Frazer said. "We know it causes at least
five per cent of all cancers globally so one in 20 of the cancers that people get is caused by
papillomavirus. It's a huge issue."

Cervical cancers kill over 230,000 women a year worldwide. But not for much longer thanks
to Professor Ian Frazer. He has created four vaccines which prevent infection with the
human papilloma virus, a common skin infection which is responsible for most cervical
cancer.

80 per cent of Australian secondary schoolgirls have now been vaccinated. Similar school
age immunization programs have begun in the US, Canada, France, UK, Germany, Greece,
Kenya, Romania, New Zealand, South Korea and Sweden. His organisation is working to
bring cervical cancer vaccines to women of developing nations and is running pilot programs
in Nepal and Vanuatu. Ian's more than 20 years of work on papillomaviruses and their
vaccines has resulted in an avalanche of accolades. Including the CSIRO Eureka Prize for
Leadership in Science (2005), Australian of the Year (2006), Howard Florey Medal for
Medical Research (2007), the Prime Minister's Prize for Science (2008), the Balzan Prize for

Since the development of the cervical cancer vaccine Ian has gone on to develop vaccines
to treat those already infected with papillomaviruses. These are now in clinical trials. Mostly
recently he has announced the possibility of a skin cancer vaccine. Again the vaccine
targets papillomavirus in this case thought to contribute to one of the most common forms of
skin cancer. The vaccine is now entering human trials. Ian doesn't expect the vaccine to
reach the public for another 10 years.
PROFESSOR BARRY MARSHALL (AUS)
National Health Medical Research Council (NHMRC) Principal Research Fellow
University of Western Australia.

Joint winner of the 2005 Nobel Prize for Physiology and Medicine, his research has illuminated the patterns of helicobacter infection in different populations around the world. It is probably the most widespread chronic infection in the world, and is nearly universal in the world's poorest countries. Thanks to Dr. Marshall's work, helicobacter is now recognized as a major factor in the development of stomach cancer. Once the most common of cancers, stomach cancer has declined precipitously in the developed world, while remaining prevalent everywhere else. Dr. Marshall hopes to see the insidious corkscrew organism controlled to the point where it can no longer pose a threat to the life and health of men, women and children anywhere in the world. His discoveries have already freed millions from unnecessary suffering.

HARALD ZUR HAUSEN (GER)

Focussing his research on papillomaviruses, he detected the Epstein-Barr virus in tissue samples of human tumors which lead to his scientific breakthrough that individual types of these viruses can cause cervical cancer. This lead to him being awarded the 2008 Nobel Prize for Physiology and Medicine. His groundbreaking research made it possible for people such as Ian Frazer and his team to develop a preventive papillomavirus vaccine, that has recently been licensed. In his long career he has received numerous awards including the Robert Koch Prize (1975), the Charles Mott Prize (1986), San Marino Prize for Medicine (2002) and also the 2008 Gairdner International Award.

DR GLENN FRANCIS (AUS)
Director Pathology Department
Princess Alexandra Hospital

Dr Glenn Francis is Director of Laboratory Services Queensland Health Pathology and Scientific Services - Princess Alexandra Hospital. He is currently heading the research on the Toowong Cancer Cluster. In a world first trial, Dr Francis and his team will use a semi-automated tissue microarrayer, which enables a high-throughput screening of a large number of tissues, to increase the accuracy of diagnosis. Dr Francis' research may lead to new discoveries and uncover information that would help the fight against breast cancer.
PROFESSOR MEL GREAVES (UK)
Professor of Cell Biology
Aetiology of Leukaemia Team

Professor Mel Greaves’ research career has focused on the immunology, cell and molecular biology, genetics and aetiology of childhood leukaemia. His work has led to new diagnostic methods and fundamental insights into the pre-natal origins, natural history and causation of the disease. In the years to come, Professor Greaves expects scientific solutions - perhaps including a smart vaccine. He has broad interests in evolutionary biology, cancer and medicine and is the author of several books, including ‘Cancer: The Evolutionary Legacy’. He has been labeled "brilliant, witty and wise" and has been the recipient of numerous international awards, including the prestigious King Faisal International Prize for Medicine and is a Fellow of The Royal Society.

PROFESSOR PAUL EWALD (USA)
Director of the Program on Disease Evolution
University of Louisville

Professor Paul Ewald was the first recipient of the Smithsonian Institution’s George E. Burch Fellowship in Theoretic Medicine and Affiliated Sciences and was a principle founder of the discipline evolutionary medicine, by virtue of the papers and books he has published from 1980 onwards. He is the author of the groundbreaking book ‘Evolution of Infectious Disease’ (Oxford) which is widely acknowledged as the watershed event for the emergence of this discipline. Ewald has raised controversy over his theory on the origins of homosexuality arguing against the current scientific theory of the existence of a gay gene. Instead he believes such a gene would have been bred out of existence, had it ever existed and that homosexuality is the result of an infection of some sort, possibly viral in origin.

PROFESSOR JAMES LAWSON (AUS)
Emeritus Professor
University of New South Wales

Professor James Lawson and his colleagues, in the first study of its kind in Australia, revealed that breast cancer could be sexually transmitted. The study has found the same form of the human papillomavirus (HPV) associated with cervical cancer in almost half the breast tumour samples they tested. Professor Lawson was recently honoured with being made a Member of the Order of Australia (AM).
PROFESSOR BRUCE ARMSTRONG (AUS)
Professor of Public Health
Sydney Cancer Centre

Professor Bruce Armstrong, Director of Research, Sydney Cancer Centre, and head of the expert panel that investigated the ABC cancer cluster. Professor Armstrong’s present major research is in the genetic and environmental epidemiology of cancer and the quality and performance of cancer services. He is an authority on the causes and prevention of skin cancer and melanoma and has made important contributions to knowledge on the causes and control of other cancers, high blood pressure and heart disease. He headed the investigation into the ABC Toowong Cancer Cluster.

PROF. JAMES HOLLAND
Mount Sinai School of Medicine, New York

Dr. James Holland currently is Distinguished Professor of Neoplastic Diseases at the Mount Sinai School of Medicine. He practices in New York City at the Mount Sinai Hospital. Dr. Holland worked at the National Cancer Institute, and was Chief of Medicine and Director of the Clinical Research Center at Roswell Park Cancer Institute before joining Mount Sinai as Chairman of the Department of Neoplastic Diseases and Director of the Cancer Center. He has served as President of the American Association for Cancer Research, of the American Society of Clinical Oncology, of the Clinical Staff of Roswell Park Memorial Institute and as Chairman of Cancer and Leukemia Group B, of which he was a founder. Dr. Holland is studying the possibility that HMTV, a variation of a virus that causes breast cancer in common household mice (MMTV), might account for approximately one-third of human breast cancer cases in the U.S. Moreover, Dr. Holland and colleagues have found that the incidence of human breast cancer varies in different parts of the world, depending on the regional prevalence of the mouse species, mus domesticus.

PROF. DAVID VAUX
La Trobe University, Melbourne

Professor Vaux is best known for his work on the mechanisms of cell death (apoptosis). He discovered that the role of the Bcl-2 gene was to inhibit cell death in 1988, and showed that failure of the cell death mechanism could lead to the development of cancer. By expressing human Bcl-2 in the worm C. elegans, he showed that apoptosis of mammalian cells and programmed cell death during worm development were the same, evolutionarily conserved process. His lab identified the first cellular members of the Inhibitor of Apoptosis (IAP) family members, and also their mammalian antagonists. Professor Vaux was awarded the Glaxo-Wellcome Medal in 2000 (shared with his long term collaborator Andreas Strasser), the Victoria Prize in 2003, and a Federation Fellowship in 2006.
LISA BACKHOUSE (AUS)
TV News Presenter
National Nine News - Brisbane

Lisa Backhouse is one of Queensland’s most experienced and respected news presenters with a career in television spanning nearly twenty years.
Lisa rose to national prominence as the outspoken public figure in the campaign to have the ABC’s Toowong studios relocated, following the unprecedented breast cancer cluster.
Lisa first joined the ABC in 1989, first travelling the country with the ABC and later moving back to Brisbane to work at Channel Ten. Following this, she secured the role as the weekend newsreader in Brisbane, where she spent the last nine years. Lisa was diagnosed with breast cancer on 1 July, 2004. She was 35 years old and the mother of two young boys. Her sister had died from cancer in her 20s and had also left behind two small boys. Lisa’s had a very aggressive form of cancer, but it was caught early. She was in surgery within a week of her diagnosis. Within three weeks Lisa had started the chemotherapy, followed by radiation. She was away from work for around eight months.

NADIA FARHA
ABC Journalist 1989-2007

Nadia started work at the ABC Toowong in 1991 and was diagnosed with breast cancer in May 2002. She had three operations before she had the mastectomy, followed by six months of chemotherapy. She was 35, with a child in pre-school, and a child in grade two.
QUOTES

Paradigm shifts don’t occur in the labs where you’re just doing the same as everybody else is doing. They occur because somebody thinks outside the box and turns out to be right.

PROFESSOR IAN FRAZER

Worldwide, cervical cancer kills about half a million women every year, and since it’s an infectious disease effectively, what that really says is that this is an epidemic of infection. Now if any other infection were killing half a million women worldwide every single year, there would be an outcry about doing something about it.

PROFESSOR IAN FRAZER

If in fact human breast cancer were due to a virus, it would be a kissing cousin of the virus that causes breast cancer in mice, because nature is too stingy to invent two ways to do the same thing.

PROFESSOR JAMES HOLLAND

You know, when you put it all together, you can’t say it’s rubbish, there’s nothing going on there. This just can’t be true. And as a scientist, when I see that, I see work that needs to be done, not arguments that need to be stopped.

PROFESSOR BRUCE ARMSTRONG

So we’re not claiming that it’s the cause or even a cause yet. What we are claiming is this is a wholly legitimate area of research. And we think this would be of great importance for women in the world.

PROFESSOR JAMES LAWSON

I want them to find what’s causing breast cancer. I want them to find it today. I want them to find it yesterday. I want them to be able to say, this is what it is, here’s a needle, no one else in this world is ever going to have to go through breast cancer again. That’s what I would like to see.

LISA BACKHOUSE

The slot machine is a wonderful metaphor for how cancer actually develops in our bodies. We need a number of mutations over a number of years to get cancer. We know the right number, anywhere between 3 and 12, but like the slot machine, let’s just say we need four mutations. And every pull of this handle is one of the risk factors. So let’s have a go at this game. This is your background genetics, who your parents happen to be, which of course is chance. You can’t choose them. One more roll of the dice. Okay, that’s an ace That’s a mutation. That’s bad luck. The next handle I’m going to pull, let’s say it’s lifestyle. It could be your diet, the amount of exercise you take and so on. The point about this game of chance is, the longer you play it, and the more times you pull the handle, the more likely it is you’ll score an ace or get a mutation.

PROFESSOR MEL GREVES

Persistent agents require persistent researchers, so in a way, it’s ... in every case, it’s quite laborious. It takes time, and it takes indeed persistence.

HARALD ZUR HAUSEN

We’re in the midst of a quiet revolution. That revolution involves recognising that infectious agents are playing critical roles in instigating cancer. Once we know an infectious agent’s causing a disease, there’s usually something we can do to prevent it. We can make a vaccine, we can an anti-infective drug like an antibiotic, or we can improve hygiene and keep people from getting infected. One of those three ways almost always gives us major advances. So it’s scary, but it think it’s actually very good news.

PROFESSOR PAUL EWALD
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