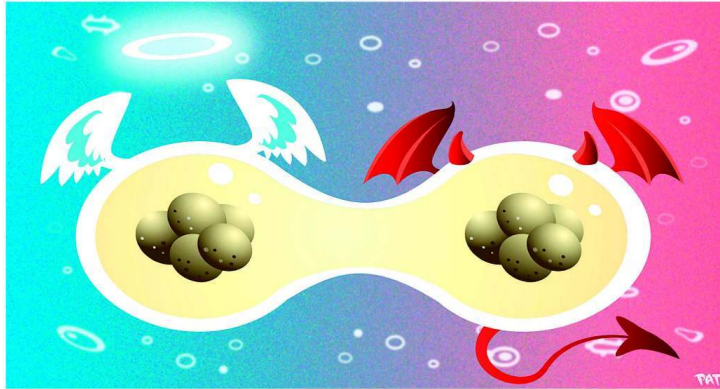




Monday  
**INSIGHT**



# Stemming the great divide

Beyond the divisive ethical debate, stem cell research holds the possibility of massive scientific advances. **DANIELLE CRONIN** reports.

THERE WAS shock, excitement and condemnation when South African surgeon Christiaan Barnard performed the first heart transplant almost 40 years ago.

Road accident victim Louis Washkansky, 59, died of pneumonia 18 days after the transplant performed in December 3, 1967.

The drugs used to stop his body rejecting the new heart had adversely

affected his immune system.

Organ transplants are successfully performed around the world today.

About 3500 Australians are on the waiting list and there were 204 donations last year — down from 218 in 2004.

Critics can come to accept advances in medical treatment that have been considered controversial in the past.

Science moves rapidly.

The public is strapped in for the ride.

The community looks to elected officials and regulators to tap or slam on the brakes when it gets too fast.

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# Stem cells just part of the answer for our scientists

Some Australian scientists and politicians are now pushing to expand stem cell research by lifting the ban on somatic cell nuclear transfer, commonly called therapeutic cloning.

This process involved taking a woman's egg, removing the nucleus and replacing it with genetic material from a cell in an adult's body.

There is no sperm involved.

In a rare conscience vote four years ago, federal MPs gave the green light for scientists to use embryos left over from IVF treatment in stem cell research.

But therapeutic cloning — which is currently used in Sweden, Singapore, Britain and some parts of the US — was outlawed.

The Federal Government hand-picked a committee, led by the late Justice John Lockhart, to review the situation.

The body recommended in December that embryonic stem cell research be expanded but, six months later, Cabinet rejected the suggestion.

It now appears almost certain that the issue will be debated in Parliament and MPs will again have a conscience vote on this sensitive issue.

In the past few years, Australian researchers have peddled their dazzling discoveries using stem cells.

Melbourne scientist Professor Silviu Itescu revealed he had discovered a unique group of adult

stem cells, known as Mesenchymal Precursor Cells, that can generate new tissue to repair and treat damaged hearts after a heart attack.

Queensland researchers found cells in people's noses that can grow into nerve, heart, liver, kidney and muscle cells.

Scientists at Melbourne's National Stem Cell Centre offer new hope to the millions of people around the world who die from lung diseases.

They have developed a technique to turn embryonic stem cells into lung cells — a step that may eventually lead to cures for cystic fibrosis, mesothelioma, emphysema, chronic bronchitis and lung cancer.

A research team from the Walter and Eliza Hall Institute induced mice to grow new mammary glands from stem cells, which may lead to new treatments for breast cancer.

Queensland Brain Institute's Professor Perry Bartlett announced the opening of a new front in the fight against brain diseases.

He found stem cells in the brain can be isolated and regenerate, which will potentially help people suffering from Alzheimer's, dementia, Huntington's disease and other degenerative illnesses.

Associate Professor Richard Boyd is working on a "fountain of youth" for the immune system. He is deputy director of the Monash Immunology and Stem Cell Laboratories in Melbourne, which is

considered the country's leading facility for this type of research.

The thymus gland — which produces a crucial part of the immune system's defences called T-cells — starts out the size of an apple but virtually disappears when people hit their 30s.

He is using stem cells to regrow the gland in the hope that this will lead to new treatments for diseases such as HIV and Type 1 diabetes.

Prof. Boyd wants the Government to lift the ban on therapeutic cloning but Professor Colin McGuckin is surprised by the focus on this type of stem cell research.

"The procedure to achieve it is very prone to failure and not enough work has been done on animals to justify the overemphasis that this one small section of stem cell research gets," Prof. McGuckin said.

He is the first Professor of Regenerative Medicine at the University of Newcastle-upon-Tyne in Britain, where researchers are credited with a world first in stem cell research — producing embryonic-like cells from umbilical cord blood that are used to grow things such as livers.

Recently, Prof. McGuckin has been invited to the Vatican to brief the Pope about their groundbreaking work.

"I think our most exciting development is the production of embryonic-like cells from non-embryonic sources — that of hu-



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man umbilical cord blood,” Prof. McGuckin said.

“We and our collaborators have been able to produce countless tissues from this including liver, blood, bone, fat, insulin-secreting cells, useful to diabetics, of course. I truly believe that human cord blood stem cells are going to be able to do what the public have been hearing was possible from embryonics.”

Prof. Boyd said that there was a lot of scaremongering in the debate on therapeutic cloning, with erroneous claims that a rogue scientist would eventually clone a human being if embryonic stem cell research was expanded.

He believes that it is important to overturn the ban on therapeutic cloning to help people with chronic diseases.

“The answer is actually relatively simple because embryonic stem cells and adult stem cells are destined to become normal tissues,” Prof. Boyd said.

“Our institute has very, very active ongoing programmes in both adult and embryonic stem cells

because we are trying to develop normal tissues to repair damage that has occurred in patients with a variety of conditions from lung to heart to Parkinson’s and all those sorts of things.

“Therapeutic cloning is the only technology that allows us to understand the disease process because the other two, adult and embryonic, are developments of normal tissue.”

Prof. Boyd argues that therapeutic cloning is the only technique that allows scientists to recreate the “disease situation” in the test tube.

“You can take the nucleus of a cancer cell. You can take the nucleus from a plaque of a multiple-sclerosis patient or the pancreas cell for someone with diabetes or a heart cell from someone with chronic heart disease or a lung cell from someone whose got lung cancer,” Prof. Boyd said.

“You take the empty egg, put the nucleus inside it and now that egg — the enzymes and proteins inside that egg — will re-educate that

nucleus to become a normal cell.

“If you understand the disease process, you can create drugs that will prevent that disease from happening again, you can use cell lines to test those drugs.”

But Prof. McGuckin said that stem cells would be only part of the arsenal to fight disease.

“Surgery and drugs will always have a role to play and we must not stop developing them in the hope that stem cells will be the answer,” he said.

“There is too much hype about stem cells and we must have balanced medical research funding. For example, use of new drugs could well be needed to keep a patient alive long enough to get a stem cell product ready.

“Cord blood and bone marrow stem cells will reach the clinic much sooner than embryonic stem cells, not for religious or moral reasons, but because there are more of them and embryonic stem cells cannot yet be made in a stable form.”



**MATTER FOR DEBATE:** Human embryonic stem cells.



  
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Prof. Boyd sees stem cell research as part of the panacea for those people living with debilitating health problems and incurable diseases.

"I certainly don't see it as pie in the sky but I think that we have to be realistic. The cures we hope we can create will take some years to develop," he said. "How long that will take will depend on the disease, it will depend on the complexity of the disease but it depends very much on the freedom of the scientist to operate.

"If we have a dream situation where the (somatic cell nuclear transfer) is available, do we see a foreseeable cure for many of these diseases? The answer is yes, but it won't be tomorrow."

These issues will confront future lawyers and doctors who are receiving lectures on ethics from Dr Thomas Faunce at the Australian National University.

He believes the Government has

taken a sensible approach to the current divisive debate on embryonic stem cell research.

It raises fundamental ethical issues similar to those surrounding abortion, euthanasia and other medical advances.

"I've dealt face-to-face with enough patients who are suffering from incurable disease to appreciate that if we have an area of research that offers them hope of a cure then it's unsatisfactory that we don't explore it thoroughly," Dr Faunce says.

"On the other hand, there's no doubt that there are significant ethical issues involved with the use of human embryos in stem cell research.

"No one can deny that. It's an incredibly sensitive area and I guess it would be wrong to not pay sufficient respect to that side of the debate," he said.

"There needs to be a regulatory system where both sides' voices are

heard and safeguards are in place but the capacity to help people with chronic illness is not inhibited."

Dr Faunce concedes that this is a difficult balancing act but argues that the views of opponents and supporters are not as polarised as some suggest.

"One that's often missed is that there is a lot of overlapping," he said.

"Both sides in this debate want to relieve human suffering. Both sides want to respect human dignity. Both sides want to respect human life."

Prof. McGuckin said the ethical debate had clouded the issue, leaving people with the perception that there is only one type of stem cell — embryonic.

"It makes people forget that cord, blood and bone marrow stem-cells are already curing people," he said.