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MSRA Next

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THE OFFICIAL NEWSLETTER OF MULTIPLE SCLEROSIS RESEARCH AUSTRALIA

Stem cells – natural spare parts

In the first few days of a human embryo, there are cells, called stem cells, which might go on to form brain or bone. Or then again, maybe blood or skin. These stem cells can give rise to all types of cells of the body. In a way, they are like plastic, and can be moulded into whatever form the body requires.

Perhaps surprisingly, even once the foetus is fully developed, there are still residual stem cells in some parts of the body.

With the body fully 'mapped' and formed, why should there still be a store of these 'blank' cells remaining? 'That is the beautiful aspect of nature!' says Professor Claude Bernard with the Monash Immunology and Stem Cell laboratories at the Faculty of Medicine, Monash University.

These adult stem cells, found in places such as the bone marrow and brain, have the potential to turn into a limited number of other cells types, when the need arises. They are like our own store of replacement parts.

Having a back-up for all the different cell types which might need fixing during our lives would require a huge inventory of specific 'spare cells'. It seems, however, that our bodies have taken a much more 'economical' approach. They have stored away these 'generic' stem cells which can be changed into the specialised cells required by the body to repair specific damage.

One of the cell types they can change into is the group that make myelin – the protective coating of the nerve cells which becomes damaged in MS.

When there is a small inflammation in the body, chemicals are sent out to start the process of repair and most recruit the cells that are necessary to do the job. But where do those cells come from? 'We know that partial remyelination goes on in people with MS and this is probably caused by stem cells,' says Professor Bernard. To see if that's so, Bernard has had to employ a conjuring trick to bring the 'invisible' process to light.

'As with some cancer research, we have implemented a marking process to observe the immune system in a laboratory setting,' says Professor Bernard. 'We have taken bone marrow, as a source of stem cells, and coloured them with a green fluorescent marker.

'If we see that the site of inflammation has green cells, we will know that they have come from the stem cells of the bone marrow donor, and not the recipient itself.' Moreover, by using markers specific for different nerve cells, such as the cells that produce myelin, we can now ascertain whether or not the injected stem cells have the capacity to develop into brain cells. Professor Bernard and colleagues hope to announce the results of this research in the very near future.

If the use of donor stem cells proves to be a viable therapy for MS patients, it has the advantage that the cells can be manipulated before injection. 'Since we now know that stem cells injected in the blood can find their way to the lesions in a model of MS, we can add 'goodies' to the package such as anti-inflammatory compounds or chemicals to allow nerve cells to regrow.'

Professor Bernard cautions, however, that even if we can repair the damage, this has to be done together with getting rid of the 'nasty' auto reactive T cells which are present in the body and turn against it. Here again, stem cells may prove useful in re-establishing the body's tolerance to myelin antigens to eliminate T cells. This is currently underway.

Stem cell research to date has been promising, especially in treating damage related to specific sites in the body, for example, spinal cord injuries where the lesion is easily located. In MS, different parts of the central nervous system are affected. Treatment therefore requires cells that can cure, can migrate through the body, and can home in on the target area.

▶ PROFESSOR CLAUDE BERNARD

Rather than using donor stem cells, other stem cell research has looked at the possibility of stimulating the body's own production of these. 'The problem of making cells proliferate, but not specifically, is that this process may lead to cancer,' says Professor Bernard.

'Since we now know that stem cells injected in the blood can find their way to the lesions in a model of MS, we can add 'goodies' to the package such as anti-inflammatory compounds or chemicals to allow nerve cells to regrow.'

PROFESSOR CLAUDE BERNARD

▶ SEE PAGE 2 FOR AN UPDATE ON THE DEBATE ABOUT EMBRYONIC STEM CELL RESEARCH

Investing in good health outcomes … via corporate and foundation support

MS Research Australia is fortunate to have attracted support from many quarters and we are keen to acknowledge their contribution here.

The Vincent Fairfax Family Foundation, Deloitte Foundation and the Association of Financial Advisers Ltd. are new corporate and foundation supporters, donating generously to selected projects.

The Vincent Fairfax Family Foundation, supporting the Ausimmune program (see SMH article over the page). This study is one of the key steps in the MSRA research strategy, and provides a strong lead into a prevention trial for MS. 'We are particularly happy to support this project as it will provide vital data to predict, prevent and slow the progress of MS, which ultimately may help reduce the incidence of MS in Australia' said Fiona Higgins Programme Manager of the Foundation.

The Deloitte Foundation is in its early stages of development. MSRA is particularly pleased that it chose Dr Rex Simmons' MS Life Study to support. 'It is very practical research which could really make a difference – we are pleased to be involved', said Clare Bower, Partner Deloitte.

MSRA is now also the chosen cause for the Association of Financial Advisers Ltd. It has specifically indicated support for MSRA's Scholarship Program. 'We have committed to raise funds this year to support two MSRA research scholarships in Australian universities – and feel that this will help considerably' said Richard Klipin, CEO of the AFA Ltd.

VINCENT FAIRFAX FAMILY FOUNDATION

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LOSING LOUIS … gaining proceeds

A generous supporter, Win Hinds, booked an entire evening at the Ensemble Theatre for Foundation 5 milllion (F5m).

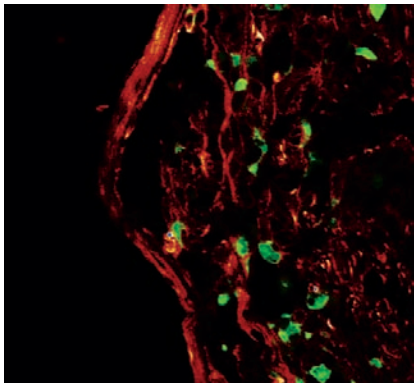
Her energetic daughter and granddaughter, Susie and Sarah Hope, rallied 200 guests for the black comedy Losing Louis. After the performance, the audience and cast met for an informal chat and a drink, where the controversial twist at the end of the play was discussed at length!

Not only was this a fun night for all, but with the help of AMP Foundation and AMP financial planners, McGrath Clarke, whose generous donation was $10,000, it raised some $28,000 for F5m and MS research.

FROM L TO R, SARAH HOPE, OWEN HAVILAND, SUSIE HOPE ARE JOINED BY CAST MEMBER AMANDA BISHOP.

CONTINUED FROM PAGE 1

Embryonic **stem cell** research



GREEN INFLAMMATORY CELLS IN AN MS-LIKE LESION IN THE CENTRAL NERVOUS SYSTEM.

The stem cell therapy discussed on page one is based on the use of adult stem cells or stem cells taken from umbilical cord blood.

The area of stem cell research that has become highly publicised relates to the use of ***embryonic*** stem cells – which is undertaken in other countries but is not yet sanctioned in Australia. However, the Prime Minister John Howard has recently agreed to a conscience vote despite the Government's earlier rejection of the Lockhart Review, recommending controlled embryonic stem cell research.

As Professor Bernard says, 'It is very encouraging that the Prime Minister is willing to consider a conscience vote on embryonic stem cell research. It will significantly encourage strategies for MS treatment as well as hope for understanding and potentially alleviating serious conditions from stroke to Alzheimer's diseases, arthritis, cancer and heart diseases'.

Use of embryonic stem cells could help researchers to discover the cellular basis for the susceptibility to a disease such as MS.

'We know that more than one gene is implicated in MS. To find out what those genes are, we could take DNA from identical twins, one with and one without MS. We would then create two stem cell lines by introducing the DNA into two eggs, and chart the development,' says Professor Bernard.

Once the genes responsible for MS susceptibility are discovered, these could be screened for and 'knocked out' before birth, ultimately removing the disease.

VICKKI ELLIOTT, SOFIE FORMICA (MC), AND MS QUENTIN BRYCE AC – GOVERNOR OF QUEENSLAND – AND NATALIE WALSH.

Art of fundraising

Take 64 artists, sculptors and jewellers, throw in a raffle, add a willing crowd of 450 happy guests. Then what have you got? All the ingredients for an extra special fundraising night, raising $53,000 for F5m and MSRA.

This was the outstanding result of a Brisbane art exhibition and cocktail party, organised through the efforts of a small group of enthusiasts (two of whom have MS) who decided to DO something to step-up the 'Race Towards A Cure'.

'It was such a happy occasion, everyone was there for the fun and the fundraising. It took us 4 months to organise and though we expected just a few hundred we had a fantastic crowd, all prepared to buy!' said organiser Vickki Elliott.

Although diagnosed just a few years ago, Vickki has only had one episode of MS to date and has been working seriously on her diet and health. She also contacted the MS Society and heard about a variety of activities including the F5M* initiative.

'The thing that motivated me was hearing that with just $50 million there might be a cure for MS. I found that amazing – just $2.50 from every person in Australia might do it,' she said.

Principal Sponsor of the evening was law firm Blake Dawson Waldron, Associate Sponsor – McDonald Keen Group, and Print Sponsor – Ray White Invest.

What a difference a Day makes!

At 7am on June 9, Sydney and Melbourne's train and bus stations were filled with green-shirted men and women! The F5m army, wearing green and purple wristbands, invited the public to purchase one on their way to work.

So transport hubs were perfect spots to launch the awareness day. The volunteers were school students, people with MS, their friends, the network of supporters of F5m and MSRA. Some people talked about friends or family members who had been diagnosed. A number of volunteers were approached by people with MS who wanted to share stories about their own journey with the disease.

'One of the objectives of F5m is to create an awareness of MS – not only that it is on the increase but that everyone can contribute to the cause of finding a cure,' said Ian Ballard, founder of the Foundation 5 Million initiative.

MSRA Wristband Day was a huge success. More than $40,000 was raised, and there are already new ideas brimming for expanded merchandise and locations for next year's campaign. There are even plans to take the day national, inviting all Australians to contribute to raising money to find a cure.

CH7'S NUALA HAFNER HAFNER (WEATHER REPORTER) INSPIRES SOME OF THE F5M TEAM

CORRINNE BARTHOLOMEW (2ND FROM RIGHT) CONGRATULATES HER TEAM INCLUDING STUDENTS FROM ROSEVILLE COLLEGE

* F5m (Foundation 5 million) is an initiative of people with MS, together with their families and friends, to help fund scientists in their search for a cure. It is based on the idea that 2,000 people with MS might raise $2,500 each at small or large fundraising events. All donations go to MS Research Australia for distribution to scientifically peer–approved research projects

www.f5m.org.au

AN EDITED VERSION OF AN ARTICLE FROM THE SYDNEY MORNING HERALD'S "HEALTH & SCIENCE", JUNE 8TH 2006, BY LISSA CHRISTOPHER

Multiple sclerosis is being mapped in Australia as a key part of global research into the disease

The battle to conquer multiple sclerosis is a multidisciplinary, international, enterprise with researchers from genetics, proteomics, epidemiology, pharmacology, neurobiology and stem cell research.

After 10 years with only two MS-specific treatments, now a queue of treatments awaits clinical trials, potentially available to people with different types of MS in the next few years.

The first of these to be released is Tysabri, shown to slow the progress of the relapsing-remitting form of MS. It works by preventing inflammatory white blood cells from leaving the blood stream and entering the central nervous system, where they can attack the protective coating on the nerve fibres.

After an initial trial, it was withdrawn and now it has been favourably re-evaluated by the US Federal Drug Administration with hopes to introduce it here. However, it needs to proceed through Therapeutic Goods Administration and Pharmaceutical Benefits Scheme, that may take up to three years, according to Jeremy Wright, Executive Director of MS Research Australia.

MS research in Australia is still developing but 'we punch well above our weight', Wright says. 'We are connected to probably all the major [MS] studies [in the world] in one way or another, and are leaders in specific areas.'

One of the more notable Australian research projects is the **Ausimmune Study**, examining the influence of environmental factors on immunity.

Preliminary data already shows that 'for every degree of latitude you go south, there is a 6 to 8 per cent increase in the number of first demyelinating events', says Dr Robyn Lucas, at the National Centre for Epidemiology and Population Health.

Dr David Booth, a research scientist at Westmead's Millennium Institute working on the genetics of MS, says: 'A dominant theory about the link of latitude to MS is you get more vitamin D where there's more sunlight, and this has an impact on the immune system'. This is why Booth is studying vitamin D receptor genes and MS.

The Ausimmune team hopes to publish its findings next year, Lucas says, and 'the best hope we have is to find some clear-cut environmental risk factors that are amenable to some sort of intervention'. Wright says there is already a prevention strategy being considered (from the Ausimmune Study) for those with a strong genetic link to MS.

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