A new state of mind

Adelaide University's **Simon Koblar** has a message of hope and caution for stroke sufferers, including Peter Couche, a successful stockbroker who suffered a brain-stem stroke 17 years ago

Peter Couche was always active and full of life, then he suddenly suffered a stroke that would change his life forever. He has not been able to walk, talk or feed himself again.

His is a story of the acute tragedy of stroke that afflicts one Australian every 10 minutes and may leave one person every 30 minutes with long-term disability, robbing them of their independence.

Peter was only 41 when this happened 17 years ago. The perception is that stroke is an old person's disease, but today in Australia one in five sufferers are under 55.

Peter's is a story I know only too well as a neurologist and stroke physician. The challenge facing neurologists and neuroscientists in the 21st century is how to repair the brain after a stroke

Every week I read scientific publications on the internet that describe new breakthroughs in stem cell technology or therapy. Many of my patients now ask: "Is stem cell therapy going to change my outlook after a stroke has left me disabled?"

Stem cells are the primitive building blocks of life. They are unique cells that have the potential to generate all 210 different types of cells that make up the human body. It is important to know that not all stem cells are the same.

There are three different types of human stem cells. First, embryonic stem cells are taken from an early human embryo, which has the broadest potential to make all 210 cells in the human body. Second, induced pluripotent stem cells, which were only made in 2007 when cells from human skin were genetically reprogrammed to produce stem cells that behave like embryonic stem cells. This was a remarkable genetic feat with great therapeutic potential. Finally, there are adult stem cells that are found in many organs of the adult body such as the bone marrow, umbilical cord, skin and even teeth.

Adelaide University's stroke research program, in collaboration with the Queen Elizabeth Hospital, is actively investigating the use of stem cells from human teeth.

When young adults have impacted wisdom teeth removed, these are used to grow adult stem cells. With better dental hygiene many older adults still have good teeth that could be used to easily obtain stem cells for future therapy.

It is a major advantage if stem cells come from your own tissue. We have demonstrated these stem cells can make nerve cells and even cause nerves to redirect their connections. Both of these qualities are needed if stem cells are to help repair the brain following a stroke.

This year we undertook a stroke study in rats and found that when human stem cells from teeth were transplanted into the brain 24 hours after a stroke the animals showed less paralysis of their limbs.

We have seen a two-fold or

greater improvement in limb mobility after stem cell therapy in stroke rats. So are we ready for human trials of stem cell therapy following stroke?

In 2005 Peter paid up to $50,000 to travel to the Netherlands and receive stem cell therapy. I have a number of patients who see me who have travelled to India and China for stem cell therapy. Most tell me, as Peter does, that they felt better following the treatment. Unfortunately, to date, I have not seen dramatic improvement in these people.

My view is that stem cell therapy received for payment alone in non-scientifically-recognised institutes should be considered with caution. An even more important issue relates to the safety of these stem cell therapies.

This year a much-feared tragedy was reported in medical journals involving a child whose parents paid for stem cell therapy in Russia. Stem cells from a human fetal brain were injected into the fluid surrounding the young boy's brain and spinal cord to treat a devastating neurological disease. Four years later the boy developed tumours in the brain and spinal cord that were derived from the transplanted stem cells.

Animal studies had previously shown that embryonic stem cell treatment into the brain results in up to one in 10 animals developing a brain tumour. This tragic case has shown us this is a real risk.

So, which type of stem cell is safe? Which type of stem cell is the best to repair the brain? These questions and many others remain to be answered by scientists over the next several years.

Peter and I regularly discuss the rapid progress in stem cell research and when he will be able to receive stem cell therapy again. Recently, while overseas, I learnt of a number of pilot human clinical studies using different types of stem cells to treat neurological disease, including stroke.

To Peter and my patients who await a change in their lives following a stroke, I say: "Keep as active as you can, remain positive but be patient a little longer and do not risk unsafe and untested treatments." We are all travelling along this unchartered road together and generating hope is worthwhile.

■ *Associate Professor Simon Koblar is director of the stroke research program of University of Adelaide and The Queen Elizabeth Hospital.*

Associate Professor Simon Koblar with Peter Couche. Photo: Randy Larcombe