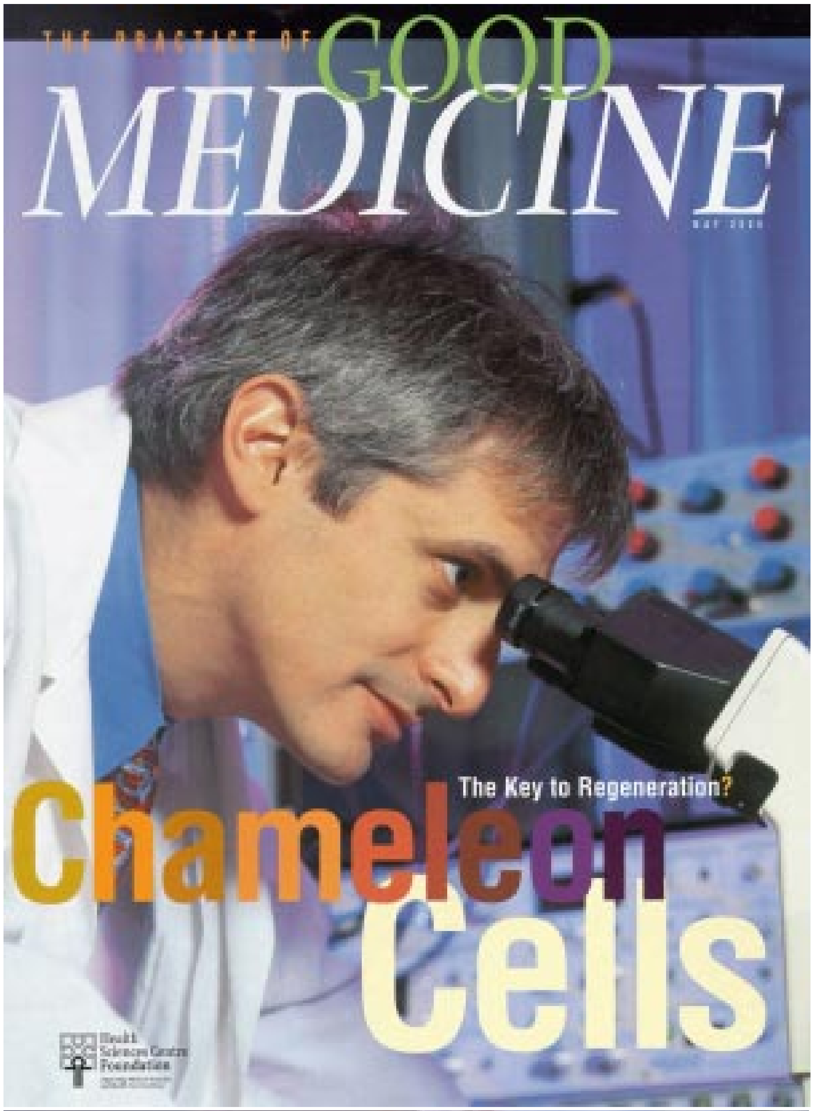
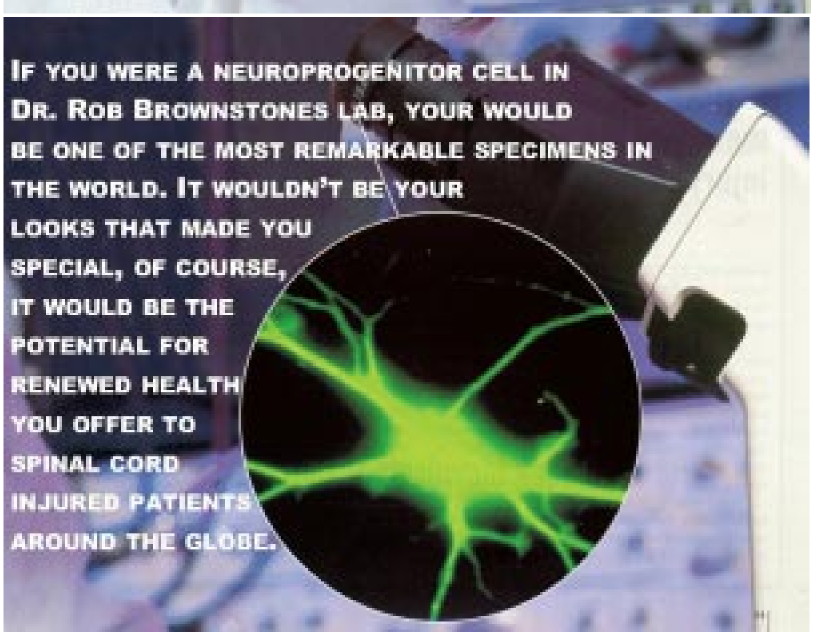

THE PRACTICE OF GOOD
MEDICINE
The Key to Regeneration?
Chameleon
Cells
Health Sciences Centre Foundation


IF YOU WERE A NEUROPROGENITOR CELL IN DR. ROB BROWNSTONES LAB, YOUR WOULD BE ONE OF THE MOST REMARKABLE SPECIMENS IN THE WORLD. IT WOULDN'T BE YOUR LOOKS THAT MADE YOU SPECIAL, OF COURSE, IT WOULD BE THE POTENTIAL FOR RENEWED HEALTH YOU OFFER TO SPINAL CORD INJURED PATIENTS AROUND THE GLOBE.

Chameleon Cells

DR. ROBERT BROWNSTONE, a neurosurgeon at Winnipeg's Health Sciences Centre and a member of the University of Manitoba's Spinal Cord Research Centre.

In the world of modern medicine, one of the most remarkable aspects is the varied functionality of the millions of cells within the human body. Into the breach comes Dr. Robert Brownstone, a neurosurgeon at Winnipeg's Health Sciences Centre and a member of the University of Manitoba's Spinal Cord Research Centre. Harvesting from the growing pool of new knowledge, Dr. Brownstone and his research colleagues are testing new models of neurotransplantation that hold great promise for the way damage to the spinal cord and central nervous system is treated.

The clues are tantalizing. For years common knowledge was that you make do with the cards you're dealt. The number and quality of brain and spinal cord nerve cells determined at the time of conception were yours alone and yours to stay. We knew that disease and injury, life and lifestyle, could dramatically reduce or damage our cells, but the belief was that once they were gone there was no turning back.

Not anymore. Scientists now know that in animal based studies, there are some areas of the brain and spinal cord that can actually produce new nerve cells. A Calgary based group discovered stem cells in the nervous system. These are immature cells in the adult that can go on to produce mature nerve cells. A California based group demonstrated the production of new nerve cells in the adult human in 1998. "The

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release of these studies enhanced and accelerated the way we look at cells and their potential to aid in the regenerative process," explains Brownstone, who divides his time between the fast paced surgical and trauma wards and the serenity of a basic science lab.

Thus it began. Several researchers around the world jumped on board with this new knowledge to begin to take the next step in understanding the restorative role that cells could play in patients affected by neurological disorders such as ALS or spinal cord injury. In simple terms, the chameleon like nature of stem (neuroprogenitor) cells allows them to mature into different types of cells. Spinal cord stem cells, for example, have the ability to become either nerve cells or glial (supporting) cells. The theory of Dr. Brownstone's research is that if we can isolate these cells and transplant them into the regions that were damaged by injury or disease, they can adapt to become new replacement cells.

Brownstone and his team are not alone in this important work. There are several other groups in the world exploring the curative side of these cells but the Manitoba approach focuses specifically on the spinal cord and will contribute significant new information in the search for treatments.

In collaboration with Dr. Larry Jordan, Co-Chair of the Spinal Cord Research Centre, Dr. Brownstone is assessing the activation of the motor system following the neurotransplantation of cells. "Dr. Jordan and his group are working on isolating cells from the spinal cord in animal models and examining their ability to grow, differentiate and become nerve cells," notes Brownstone, highlighting the effectiveness of the partnership between the two labs.

The cells are then provided to Dr. Brownstone who transplants them into the injured nervous systems and measures the outcome. "At the moment we are working specifically with the cells that I know best through previous study - motorneurons. Motorneurons connect to our muscles and cause them to move. The transplantation process we are using involves injecting the neuroprogenitor cells into a severed nerve in the leg. Over a period of many weeks we have observed that the cells survive, some turn into motorneurons and thereby regenerate the connection to the muscle."

The hope for the future is to move from the injured leg nerve to the more complicated environment of the spinal cord. How these properties will transfer into treatment for human spinal cord injury and disease will be answered by future research. At this point, the research is at the very basic science stage. "It's not fancy," notes Dr. Brownstone modestly. "It is basic laboratory research."

And of his fast paced career as a neurosurgeon, Brownstone admits that the approaches to clinical work and basic science research are in complete contrast. But like the cells he studies, he adapts to the alternating demands and responsibilities. "The clinical side of my work provides perspective," explains Brownstone. "At the end of the day it's all about helping people."■

S.A. Storey lives in Winnipeg and has written extensively about health research.