

## Charting a new course in brain research

By Liz Clarke

Medical research scientist Dr Evian Gordon's quest for knowledge has taken him on what he describes as the last major voyage of discovery in the human body - the study of the brain.

The former University of the Witwatersrand medical student, who is now based in Sydney, is back in South Africa for a short visit and eager to share his understanding of the functioning of the human brain.

Gordon decided to become a neuroscientist after seeing a fossilised skull, later identified by anatomist Raymond Dart as the "missing link" between ape and man.

"I looked at the remains of this 5 million-year-old hominid who walked upright and used his hands with great dexterity, and realised what extraordinary changes had taken place in his brain since his early predecessors. That really fascinated me," he said.

"There are still secrets, many of them. The human brain has the processing power of the world's most powerful computers and yet, with not much persuasion, it can easily be disrupted, leaving its owner with a whole gamut of problems: forgetfulness, helplessness, anxious, suicidal, highly stressed, depressed or a combination of all. We need to probe and we need to know," he maintains.

Gordon's "probing" work can only be described as pioneering. What is needed, he believes, is an evidence-based database to standardise the assessment, care and treatment of a number of brain-related disorders, including post-traumatic stress syndrome, dementia, Alzheimer's disease, attention deficit disorder and depression, many of which are not fully understood. In addition, there needs to be a method of standardising test procedures on an international platform.

"Take for example a brain specialist working in Durban who would like feedback from other doctors about a certain condition. If the evidence gained is not based on the same diagnostic procedures, there is not much merit in it.

"But if thousands of patients from all corners of the globe are assessed and scored in exactly the same manner, the cumulative body of literature becomes profoundly significant from a research, pharmaceutical-development and treatment point of view," explained Gordon.

An important moment in the development of Gordon's ideas occurred when a young woman who was attacked from behind with a blow to the head was referred to Sydney's Westmead Hospital, where Gordon was the director of the Brain Dynamic Centre.

She suffered from a lack of concentration and fits of crying. A psychologist recommended that she undergo Gordon's then newly devised standardised tests, which were matched with examples in the database.

It led to the conclusion that while no organic damage to the brain existed, there was disturbance in the fear networks of the brain's sub-cortex, the central part that processes emotions.

"There was no doubt in my mind at that point that we were on the right track and that this type of service needed to be expanded," said Gordon.

But bringing his vision to reality has been a long and painstaking process that involved not only input from leaders in the field of neuroscience and related disciplines but the raising of funds to see it through to fruition.

One of those leaders was Professor Peter Robinson, whose revolutionary computerised model of the brain has taken the reading of electrical activity in the brain to new levels.

Gordon also believes that having thousands of evidence-based cases in the database that are easily retrievable would fine-tune the current move towards personalised medicine and also lower costs by eliminating the "trial and error" syndrome.

As the chief executive officer of the Brain Resource Company, Gordon is in South Africa to promote what have come to be known as brain resource centres.

Five of these "brain resource centre" laboratories will soon be installed in South African hospitals run by Netcare: St Augustine's in Durban, Sunninghill Hospital in Johannesburg, Pretoria East Hospital, Union Hospital in Alberton and City Hospital in Cape Town.

Netcare's Professor Deon du Plessis said the decision to establish the centres in South African hospitals was part of a shift in healthcare from reactive to proactive science.

"We need evidence-based efficiencies to ease the cost burden," he said.

Patients at "brain resource centre" laboratories perform a battery of standardised tests which tap in to the brain's major functions via a set of recording devices on the scalp which at the same time monitor the amount of sweat as well as heart and respiratory rates.

Cognitive "real world" responses such as reaction, memory, attention, language and planning are observed, actual brain structure is monitored by magnetic resonance imaging and genetic material is collected by cheek swab.

An exciting potential use for this precise and comprehensive harvesting of personal data is in the assessment of elite sportsmen and sportswomen. Gordon believes that this type of targeted monitoring would help to shed light on how champions are made and why those with equal physical abilities are unequal when it comes to the mental ability that is somehow needed to win. Such information might be particularly useful for tennis players and cricketers.

In broader terms, Gordon and his contemporaries are convinced that his standardised test procedures will result in a better understanding of humankind's unique and most complex organ.

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