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## **Patch-clamping apparatus helps UCT researchers “listen in” on brain’s communication**

A patch-clamping apparatus, donated to the University of Cape Town by UCT alumnus and leading neuroscientist Professor Henry Markram, will enable researchers to “listen in” on the brain's electrical communications. The patch-clamp technique won German physiologists Erwin Neher and Bert Sakmann the Nobel Prize in Physiology or Medicine in 1991.

The patch-clamp technique is a powerful and versatile technique for studying the electrophysiological properties of biological membranes. It has revolutionised research in cellular and molecular biology, and is allowing researchers to ramp up their understanding of the brain’s circuitry.

“This is an exciting opportunity to advance our understanding of the changes in brain function that occur in disorders such as epilepsy, which ultimately could lead to new approaches to treating patients,” says Professor Graham Fieggen of UCT’s Division of Neurosurgery.

The equipment consists of a sophisticated microscope, imaging system and numerous high-precision robotic arms, which allow fine-tipped glass electrodes to be gently lowered onto multiple brain cells in an intact slice of brain tissue. This can either be from an experimental animal, or from a patient who has undergone a neurosurgical procedure where abnormal tissue has needed to be removed. These cells can be kept alive for a short time by perfusing them with an artificial brain solution, allowing scientists to investigate how cells communicate in the living brain.

This state-of-the-art equipment promises to enhance basic neuroscience research at UCT’s faculty of health sciences. Worth approximately R1.5 million, the apparatus is the first of its kind for neuroscience research in the faculty, and possibly at any African institution, says Professor Lauriston Kellaway, head of the department of human biology at UCT, where the equipment is located.

“The equipment provides direct access to four individual brain cells simultaneously, allowing researchers to ‘listen in’ on the electrical communication, which occurs within brain circuits,” explains Dr Joseph Raimondo, who will be leading the research utilising the patch-clamping equipment. “It’s this sort of activity between brain cells that forms the basis for thoughts and memories.” Now UCT researchers can explore the cellular basis of these complex

phenomena as well as probe the mechanisms underlying conditions such as epilepsy and schizophrenia.

The donor of the equipment, Professor Markram, is the co-director of the Human Brain project and is based at the École Polytechnique Fédérale de Lausanne, Switzerland. Last year he landed what is understood to be the biggest funding award in the history of neuroscience - a €1 billion (R13.7 billion) grant by the European Union over 10 years. This will enable the UCT BSc honours graduate to scale up his work in an attempt to simulate the entire human brain.

***ENDS***

***Issued by: UCT Communication and Marketing Department***

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