



International Society for Neurochemistry

SUPPORT FROM THE COMMITTEE FOR AID AND EDUCATION IN NEUROCHEMISTRY (CAEN)

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FINAL REPORT

Dr. Ngalla Jillani, Senior Research Scientist

Institute of Primate Research, Department of Non-Communicable diseases

P.O. Box 24481-00502

Karen, Nairobi, Kenya

Email: ngalla.jillani@gmail.com

Title: Towards building a Primates brain bank

Preamble:

Getting perfectly perfused brains for use in various research activities related to the brain requires basic equipment and chemicals, which this project proposed to undertake through the CAEN grant.

The absence of a non-human primate's brain bio-bank of perfectly perfused and stored brains for use in various research activities related to the brain in Kenya prompted the need to start one at the Institute of Primate research with a grant from CAEN. This grant was awarded to me after completion of my PhD at the University of Witwatersrand, Johannesburg. Upon returning to my home laboratory, where I was charged with starting a laboratory in Neurobiology within the Department of Non-Communicable diseases, this project became the starting point and a boost to my research career. The established brain bank has attracted several research interests from colleagues and other research scientists within Kenya who have voiced interest to use it for neurobiology studies using non-human primate's brains. This is a promising bank that will keep growing, thanks to the grant from CAEN that has enabled me start it off for future research purposes.

Background:

Investigations into the neurochemistry of the brain require excellent perfusion of the brain. Free floating immunohistochemistry, which is the most commonly used experimental protocol in the laboratory to locate neuronal groups and pathways requires that only neuronal cell bodies are clearly stained by the markers. Similarly, protocols for quantifying neuronal numbers require that only neuronal nuclei are present on every prepared brain sample. Presence of blood cells in the samples will lead to erroneous results through staining of other non-neuronal cell bodies. For this reason, proper perfusion rids the brain tissue of any blood, thus making the resultant tissues useful for reliable data.

Whole body intra-cardiac perfusions was done on the animals by first running 0.9% saline followed by 4% paraformaldehyde solution in 0.1M phosphate buffer. Vervet monkeys and Baboons of all ages and sex, commonly used for research purposes, were perfused and their brains carefully extracted and put in 4% paraformaldehyde solution for post-fixation overnight before being transferred into antifreeze for storage at -20 degrees Celcius for future research activities and sharing with collaborating partners from other laboratories and countries.

This was undertaken in liaison with other project leaders at IPR, where animals that were to be sacrificed after experimentation and or clinical trials were acquired for perfusion, their brains extracted and stored for future use in neurobiology research projects in the neurobiology program.

Hypothesis:

It was hypothesised that behavioural outcomes in severe tropical disease such as cerebral malaria and trypanosomiasis is associated with anatomical changes in the cerebral cortex

Aims:

The main aim was to create a bio-bank that would be useful in studies which investigate possible links in changes in brain anatomy in cases of severe tropical diseases infections in primates and use this information to formulate mitigation measures for intervention against brain damage caused by these diseases.

Results:

There exists a well perfused brain tissue bank that has been established through time and is growing by the day. These tissues are well stored and in perfect condition for use in neurobiology studies, now and in the future. The techniques and knowledge for perfusion and storage of whole brain tissues have been imparted to technicians and students in the institute. This will ensure a bright future in neurobiology studies at the institute and is expected to last for the lifetime of the institutional goals and research path and strategy.

So far, about 54 brains have been collected and some have already found use in various neurobiology-related and other research activities. This is an ongoing project and we expect to add more into the bio-bank with time.

Figure1: Well perfused and preserved whole brain tissue:

a and **b**: stored in containers for future use

c: Having been used for research purposes



a



b



c

Purchases:

The funds were used to purchase basic equipment, chemicals and other laboratory consumables for the acquisition, perfusion and long term storage of whole brain tissue from sacrificed animals for purposes of creating a whole brain tissues bio-bank.

Conclusion:

This grant has been a game changer for me in my formative period of my research career and has enabled me start a tissue bio-bank that can be used to answer critical questions regarding the brain in future. For this reason, I would like to express my gratitude to the committee for aid and education in neurochemistry (CAEN) for the opportunity accorded to me through this grant to start my research career in style. With this support I was able to pursue a research idea I wouldn't have been able to undertake otherwise and achieving good results, which will be explored further in future research undertakings. This grant was paramount in giving me a firm stead in my research career, the giant step towards future independent career goals.