Lab Visit Report

Gwladys T. NGOUPAYE, PhD Student at the Laboratory of Animal Physiology, Department of Animal Biology, University of Ngaoundéré, Cameroon.

Location:

University of KwaZulu-Natal in Durban, South Africa.

Lab Supervisor:

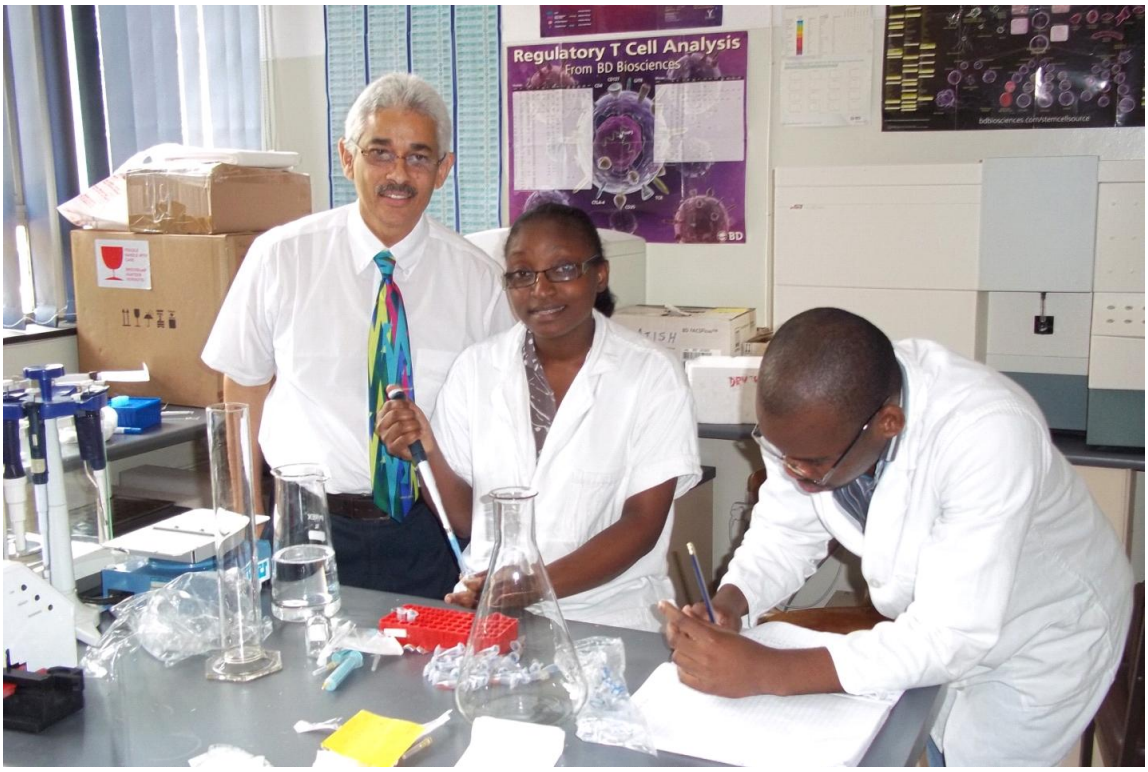
Prof. Willie M.U. Daniels, Head of School: Medical Sciences on the Westville Campus

Funding

Funding was provided from ISN-CAEN category A, to contribute to Ph,D research work

Full Overview of the Lab visit

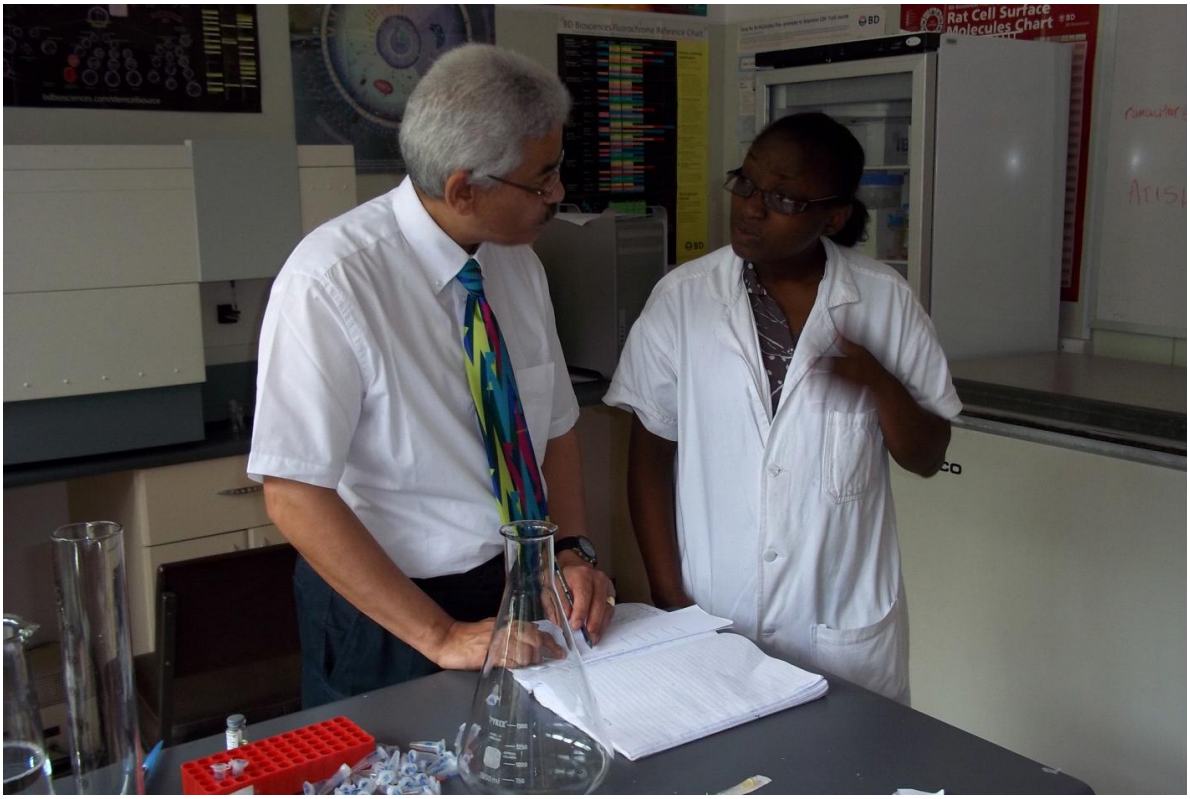
I arrived at Durban Airport, South Africa on July 4th, 2011 and was warmly welcomed by Prof Daniels himself. He took me to a nice apartment he reserved for my stay. Two days later, on July 6th he introduced me to his team in the Discipline of Human Physiology on the Westville Campus of the University of KwaZulu-Natal in Durban, South Africa.



Prof Willie Daniels, I and Simo Zulu, one student of his research team

Our first working session was evidently based on studying and planning the project and how to undertake it. Since we had to work using animals, we applied for ethic approval from the Animal Ethics Committee of the University of Kwazulu-Natal. While waiting to hear from this committee, we deepened our knowledge and understanding from various documents related to our project as well as familiarize myself with some of the techniques that were practiced in the laboratory. This included on how to remove the hippocampus from the brain, do an intracerebral injection using the stereotaxic approach and biochemical assays such as protein determinations by the Lowry methods and ELISA assays.

Finally, we got the agreement at the end of August and started our experiments investigating the emotional characteristics of animals in which temporal lobe epilepsy was induced. The behavioural work was performed at the Biomedical Resource Center of the University of KwaZulu-Natal where the animals were bred and housed, and the biochemical assaying occurred in the Neurosciences Laboratory in Discipline of Human Physiology.



Prof Willie and I discussing about some mechanisms

Once animals displayed recurrent seizures the emotional status of the animals was assessed. For instance the forced swim test was used to determine depression-like behaviour in the animals. Another group of animals (a positive control group) were

subjected to a restraint stress paradigm that was known to increase the immobility time in the FST. Therefore in the first set of experiments, we compared the depression-like behavior between epileptic rats, restraint stressed rats, and normal rats which were just handled. In the second set of experiments, we assessed the efficacy of an extract from a plant indigenous to Cameroon in the treatment of the depression-like behaviours as displayed by the various groups of animals. The effects of the plant extract were compared to saline and fluoxetine, a common antidepressant.

In addition to the behavioural tests and to gain insight into the neurochemical mechanisms that may underlie the behaviours, we also determined the plasma levels of ACTH, corticosterone, BDNF levels in the hippocampus, assessed the presence of apoptotic activity in the hippocampus by measuring caspase-3 levels using the flow-cytometry.

Our results showed that rats that were chronically stressed as well as rats that developed temporal lobe epilepsy (TLE) exhibited depression-like behavior, although in rats with TLE these symptoms were less severe. Rats that were only handled displayed minimal signs of depression-like behavior when compared to the other two groups. The neurochemical results supported the behavioural findings in that the levels of ACTH were higher in rats that were chronically stressed compared to the rats with TLE, while the group of rats that were handled showed the lowest level of ACTH. This patterns of neurohormone release was mirrored in the corticosterone concentrations of the different groups. In contrast to the hormonal data, the level of BDNF was highest in control group of rats (handled only) followed by the chronically stressed group and rats with TLE showing the lowest values..

The second part of our experiments showed that the macerate of *G. dalenii* (15 mg/kg) reduced immobility time in rats with TLE comparable to fluoxetine (15 mg/kg). Interestingly fluoxetine reduced the immobility time in rats chronically stressed with the macerate of *G. dalenii* being less effective. Once again the neurochemical results supported the behavioral results observed. Indeed the macerate of *G. dalenii* markedly reduced the level of ACTH and corticosterone, and increased the level of BDNF in rats with TLE while in the group of rats exposed to chronic stress, fluoxetine proved to be more effective in decreasing the level of ACTH and corticosterone and increasing the level of BDNF than the macerate of *G. dalenii*. The seven days treatment with the macerate of *G.dalenii* (15 mg/kg) did not alter the spontaneous locomotor activity of rats. Unfortunately due to time constraints we were unable to complete the caspase-3 assays.

Everything went well and I left Durban on November 5th 2011.

Relevance to my Research

The work that I did in the University of KwaZulu-Natal with Prof Willie M.U. Daniels and his team has significantly improved my knowledge and understanding on techniques in neurosciences, and will enable me not only to finish with my PhD work, but will also be useful in the forth-coming years in my research profession.

Acknowledgments

I would like to thank the ISN for providing funding. Without their generosity, this Lab visit would not have been possible.
I would also like to thank the supervisor of this Lab – Prof Daniels for his framing, knowledge, and full support during this Lab visit, as well as his entire team for their collaboration.

A part of the research team and I