



MBDx

Mbarara Brunel
Diagnostics Research

April 2013

Visit to Mbarara

By Pascal Crow

Last month Dr Ruth Mackay and myself from Brunel University's DoCLab visited Mbarara University of Science & Technology (MUST) in Uganda. The purpose of this visit was to meet with Deus Tusibira, and colleagues in the Faculty of Medicine at MUST, whom I met at a Biochemical society conference previously and shared an interest in diagnostics. During this 9 day visit we established a research partnership to develop inexpensive devices for the diagnosis of infectious diseases, gave a seminar on advances in point-of-care testing (POCT), held a workshop for graduate students on POCT and visited the key laboratories on the MUST campus and Mbarara regional referral hospital.

Mbarara Brunel Diagnostics Research

The collaboration established the Mbarara Brunel Diagnostics Research Group (MBDx) a group of engineers, scientists and doctors located at both Brunel University and MUST who will work together in the development of low-cost diagnostic tests for infections relevant to the developing world. Currently much of the developing world, including Uganda, lacks the infrastructure, knowledge and finances to adequately diagnose infectious disease, which are a considerable social and economic burden. It is hoped that

in addition to providing more affordable diagnostic tests that this collaboration through its interaction with international partners will also build capacity in the local academic and medical workforce. It was felt that modeling the MBDx group on the successful team we have here at the Brunel DoCLab (led by Prof. Balachandran) would be worthwhile, specifically a strong multidisciplinary team bringing together biologists, biochemists, medical doctors, electronic, mechanical and biomedical engineers to provide a synergistic set of skills to rapidly advance the research and development process.

Our initial work will focus on the further development of paper-based diagnostic tests currently underway in the DoCLab and apply these to the diagnosis of *Treponema pallidum*, the causative organism of a number of human diseases including syphilis. Syphilis is a significant cause of treatable morbidity and adverse pregnancy outcomes. With an estimated 12 million people infected each year the WHO has identified the screening and surveillance as one of the key factors in eliminating syphilis which has relatively inexpensive treatment options. The ability to cheaply and rapidly screen pregnant women for this infection would greatly reduce the burden of this infection.



In addition to the technical and administrative aspects of the trip we had several very enjoyable interactions with the locals.



Deus Tusibira demonstrating the use of the DoCLab prototype hand-held diagnostic device to a clinic nurse.

In addition to the development of simple paper-based tests the current work of the Brunel DoCLab team in developing automated devices for molecular testing using isothermal amplification will be expanded to include the MBDx team in Mbarara for evaluation and design to ensure compatibility with the needs of POCT in the developing world.

Seminar, tutorial session and interaction with clinicians

The seminar, tutorial session and interactions with clinicians in Mbarara regional referral hospital gave us the opportunity to discuss the design and implementation of POCT into the existing environment and care pathways. We took this opportunity to get feedback on the use of technologies such as the Axxin T16 instrument for real-time isothermal amplification assays used by the Brunel team and the Helicase dependent amplification (Biohelix, USA) methods being employed by our team at the DoCLab to develop even simpler POCT devices.



Q&R at the public seminar provided us with valuable feedback on the development of point-of-care devices

These technologies were seen as potential remedies for many of the difficulties being encountered in the hospital as the existing diagnostic capabilities were very limited, time consuming and expensive. It is our hope that we can use this partnership to further develop POCT devices at a cost that will allow their use in the developing world.



Dr Ruth Mackay presenting the use of microfluidics for point-of-care testing at the seminar.

Charity

In addition to the establishment of a research partnership, we have decided to form a small charity to collect unused laboratory equipment, supplies and books and ship these to laboratories in the developing world where such resources are scarce and out of date. In the first instance we are hoping to establish a small PCR lab at MUST to assist with teaching, research and diagnosis. We then hope to expand this to other locations. If you have any working equipment that you no longer need and feel may be useful, please let us know and we will organize collection and delivery.

Acknowledgements

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