

Fighting MRSA and C.difficile

Submitted by: Cambridge Design Partnership

Monday, 18 May 2009

Universal Sensors, Nottingham Trent University and Cambridge Design Partnership to help in the fight against the hospital superbugs, C.difficile and MRSA.

Universal Sensors Ltd (Cambridge, UK), Nottingham Trent University (Nottingham, UK) and Cambridge Design Partnership (Cambridge, UK) have entered into a strategic alliance to develop a hand-held system to detect the hospital superbugs, C.difficile and MRSA. The collaboration is funded through the new Small Business Research Initiative (SBRI), in contracts that were awarded by the National Institute for Health Research (NIHR) under its Invention for Innovation (i4i) Programme, the results of which were announced on 15th May 2009.

The control of Health Care Associated Infections (HAIs) and improving the cleanliness of hospitals are primary objectives for the UK's National Health Service (NHS), but reducing the incidence of HAIs from our hospitals has been a challenge. In 2008, the NHS spent £53 million undertaking a comprehensive "deep clean" of every hospital in the UK and many NHS Trusts are now reporting a decrease in the incidence of both C.difficile and MRSA as a result of this and other initiatives implemented by dedicated Infection Control teams.

As well as increasing the quality of healthcare, there are also significant economic benefits to reducing the incidence of HAIs; for every patient infected with MRSA, the additional burden to the NHS is an extra 10 days in hospital for the patient, whereas for C.difficile, this can rise to 21 days. This costs the NHS £4,000-£10,000 per infected patient. Systematic processes for cleaning are therefore vital to control HAIs. But it is no easy task to ensure that an area decontaminated by cleaning after an outbreak is really free from live bacteria or C.difficile spores, as there are no quick and simple environmental tests available.

Universal Sensors, in collaboration with Nottingham Trent University and Cambridge Design Partnership, are working to create an environmental testing device to make this process fast and simple to perform for use in hospitals and in the community. The result will be a new highly sensitive biosensor-based product that can detect pathogens in 5 minutes (traditional tests have to be performed in a specialised laboratory and can take 2-3 days to get the results back to the Infection Control team).

"The impact that this new product could have on HAI control is significant." stated Dr Graham Cooley, CEO of Universal Sensors Ltd. "The ability to place greater control into the hands of HAI Control Specialists will be a real benefit: it will allow the Infection Control Team to know within 5 minutes whether an area is safe for a patient to occupy and it can be used by workers who do not possess specialist training."

The collaboration was assembled by Cambridge Design Partnership who had worked with Universal Sensors in the development of the manufacturing technique for their unique sensors. The combination of the sensor technology with Cambridge Design Partnership's platform for hand-held devices could be a real step forward. Cambridge Design Partnership's hand-held platform is a powerful but low cost micro-processor-based technology, developed by the company over several years. Versions of this platform

have already been incorporated into products such as: Satmap's Active 10TM GPS product which uses Ordnance SurveyTM maps to help those who enjoy outdoors sports and the driver-friendly Road AngelTM system.

Re-applying this platform technology for use with the Universal Sensor detection system allowed the creation of a new mobile device for performing immunoassays (ELISA or enzyme-linked immunosorbent assay) and tests for DNA from pathogenic organisms. This platform will be developed to comply with the applicable EU directives for medical devices (In Vitro Diagnostic Medical Devices Directive 98/79/EC) and FDA requirements for a Class II Medical Devices in the USA (market clearance by 510(k) premarket notification) as well as being CE marked and UL approved as a laboratory instrument.

"The development of a mobile test platform is an important corner stone of this collaboration", commented Dr Duncan Purvis, CSO of Universal Sensors, "but we also needed leading research scientists who could develop tests for HAIs and we are delighted that Dr Alan McNally of Nottingham Trent University agreed to collaborate with us. New tests developed by Dr McNally will be integrated into our mobile product platform which is called eLISATM (electronically linked immunosorbent assay). Dr McNally is a highly respected leader in the development of assays for infection control and is part of a research programme leading to the development of a portable test for bird flu."

Dr McNally explained "I was deeply impressed when I first saw the power and potential of the Universal Sensor technology. It is the capability that I have been seeking for some time. Its speed, sensitivity and flexibility means that this technology can be applied to a range of different assays (tests) as well as for MRSA and C.difficile, and I am very pleased to be able to make a contribution in developing a new product for infection control."

The development programmes of this SBRI project, which are funded by the NIHR through the i4i Programme are to be undertaken in two phases. The consortium anticipates completion of this first phase within 6 months and intends to take the eLISA system into production by the end of 2010.

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