Breakthrough in treatment of cleft palate

Scientists working on a treatment for babies born with cleft palates have made a promising breakthrough and the first clinical trials are planned for early next year. Clefts are the most common birth defect in Britain, with one in every 700 babies affected; currently in severe cases radical surgery is required to correct the problem, and in addition future complications can occur as the child grows into an adult. The preliminary results on a hydrogel material studied using the Science and Technology Facilities Council’s ISIS neutron source show treatment for severe cleft palates could be carried out without the need for complex surgery.

Cleft palates are currently repaired by surgically repositioning the available palatal mucosa, the tissue structure at the roof of the mouth, in order to cover the gap in the palate. However, if the cleft defect is too wide there may be insufficient local tissue available to close the gap without undertaking quite radical surgery. It is these severe cases that can cause future complications for infants as they develop into adults – particularly with speech and facial growth problems. [more]
A team of researchers at the University of Oxford, the John Radcliffe Hospital in Oxfordshire, and the Georgia Institute of Technology in the United States has used ISIS to look at hydrogel on the molecular level to try and gather enough information to develop materials that could be used for a potential new treatment.

“ISIS provided us with the high level of structural detail we needed to assess the new material. It gives unique and accurate results that we can't get with any other technique,” says Professor David Bucknall from the Georgia Institute of Technology.

The new potential treatment for these severe cases involves inserting a small plate made of an anisotropic hydrogel material (similar to that used in contact lenses) under the mucosa of the roof of the mouth of the patient.

The hydrogel gradually expands as fluid is absorbed, encouraging skin growth over and around the plate – a process known as ‘tissue expansion’. When sufficient skin has been generated to repair the palatal cleft, the plate is removed and the cleft is repaired by using this additional tissue. The success of the preliminary results of self-inflating anisotropic hydrogel tissue expanders mean clinical trials in this area are expected to take place early in 2011.

“Babies born with cleft palates usually have problems feeding, and may have speech difficulties in later life, as well as issues with their hearing, dentition and facial growth,” says Mr Marc Swan a plastic surgeon at the John Radcliffe Hospital in Oxford, and the instigator of the study. “The severest cases often have the least favourable outcomes and unfortunately these are the most challenging children to treat surgically.”

Rosanna Preston, CEO of CLAPA (The Cleft Lip and Palate Association) commenting on the research said; “Facial clefts of the lip or palate are the most common birth defect and it is vital that we continue to explore new treatments to help those affected. This research is particularly interesting as it addresses the most severe cases where the effects on the child’s development may be greatest. We will be excited to see the results of the clinical trials.”
The study is the first to be carried out using the Offspec instrument at the recently opened second target station at ISIS. Offspec is the world’s most advanced neutron instrument for studying new surface structures and can be used for a number of applications including biological membranes and patterned materials for data storage media.

Andrew Taylor, ISIS Director says: “This study shows how fundamental knowledge about the structure of materials can be used to develop new technology. The instruments at the new ISIS second target station build on 25 years of expertise developed in the UK. They are designed to allow new areas of research to flourish – particularly in soft matter and bioscience – and make it easy for research teams to get the important results that they need. We’re pleased that at ISIS we can continue to contribute to research affecting everyday lives.”

This work is just one example of the work STFC supports in the area of healthcare.

STFC is developing a sector focused Futures Programme to address the global challenges, that will affect us all, in the areas of security, energy, environment and healthcare.

STFC has a wealth of technology, expertise and know-how that it is keen to use in the support of new medical developments and has projects at various stages within this important area.

About cleft palate and the potential treatment

Clefts are the most common birth defect in Britain, affecting about one in 700 babies. Of these, 50% are born with a cleft lip and palate, 25% with just a cleft palate and 25% with a cleft lip alone.

The hydrogels tested are similar to those used to make soft semi-permeable contact lenses (which absorb a small volume of water to keep the surface of the eye hydrated). The new polymers being investigated enable a larger volume of water to be absorbed and retained, promoting an expansion of the gel to up to ten times its original size whilst still remaining structurally sound.
Skills for Advanced Technology

Skills for Technology, led by STFC, is providing over 800 specialist qualifications in Advanced Instrumentation, ICT and Electronics. The three year project, now in its final year, co-financed by SEEDA and the European Social fund is boosting the skills base, giving training opportunities to employees of small and medium sized businesses across the South East region.

STFC have been a highly visible lead partner, bringing a strong identity to the programme and supporting the message of high quality support to SMEs. They are helping to raise the profile of science and technology, through working in partnership with Aylesbury Training Group and Central Sussex College. The three partners have been responsible for delivering industry-led training programmes, developed to cover the topics and skills that are most required by employers.

Against the serious backdrop of economic slowdown, many SMEs have had fluctuating activity levels and extra time on their hands. A number of these have prioritised investment in training and development. For example MGB Electrical Ltd based in Buckinghamshire is becoming recognised as a leading manufacturer and distributor of hazardous area products. They have a wide range of enclosures available from small plastic junction boxes to floor standing enclosures in steel, stainless steel and GRP Polyester. The engineering department designs and machines thousands of boxes every week utilising comprehensive CNC turning capabilities. Daniel Tucker attended a Computer Aided Design course delivered by Aylesbury Training Group in December 2009, in order to become the second person within the company to have CAD skills. This means that drawings can be produced more quickly and timely.
Peter Dickson, MGB Electrical’s Engineering Manager felt that in addition to sharing workload the course offers significant benefits in eliminating the need to produce samples. They now simply email models to customers for immediate approval or modification. This will save materials and time. Many of their clients are in the oil and gas industry and these benefits are important to them.

The range of training courses on offer is extensive and includes:

- Advanced Instrumentation
- Electrical & Electronics
- ICT
- Machinery Directive Legislation & Value Analysis / Value Engineering

Graham Peters from Central Sussex College comments ‘This project is working very well for us. We have developed and now deliver Level 4 Vacuum Systems and Electro Pneumatics & Hydraulics courses. This work has enabled us to market these courses widely, and to leverage partnerships we have with commercial organisations in Milton Keynes. As a college we have now provided access to the same resources for use by our core students. Our commercial partners have also benefited from getting involved in this project. It has enabled us to develop KTPs within industry, via STEM Sussex. We have also put ourselves in a position to apply for new funding streams. This project does fit very well with our existing prospectus so we were able to hit the ground running’.

The project runs until the end of December 2010.

Please contact Chantal Jefferies for more information:
chantal.jefferies@stfc.ac.uk
01235 446483
www.skills4technology.co.uk
Future events

CEOI Technology Showcase 2010
Thursday 10th June 2010, London

Earth observation instrumentation - see the technology, realise the potential

Instruments previously developed for Earth observation programmes have yielded technologies which have been successfully exploited into other market sectors, such as defence and security, analytical instrumentation, healthcare and medical. There are many more potential beneficiaries of these technologies and this event offers the opportunity to find out more, network and meet others for possible collaborations and partnerships.

A key focus of this bi-annual knowledge exchange event will be the wider perspectives and uses of projects undertaken by the CEOI. The day will include a schedule of presentations on the CEOI and its projects, followed by an exhibition of the technologies. This is a great opportunity to see the potential of Earth observation instrumentation technologies and their opportunities and to network within this growing and vibrant community.

For further information and to register for this event, please follow the link www.qi3.co.uk/archives/3193 registration and further information

Scottish Technology Showcase 2010
Wednesday 26th May 2010, Glasgow

The best of SUPA at the Scottish Exhibition and Conference Centre
To register, please follow the link www.scottishtechnologyshowcase.com

REMINDER
Changes to the IPS applications closing date 2010

The IPS closing date scheduled for July 2010 has been cancelled. This is due to the expected migration of the STFC grant processing system to the Shared Services Centre (SSC) system.

The October closing date of 5th October may be postponed by one week. When more information is available on this the closing date will be publicised and shown on the appropriate STFC web pages.