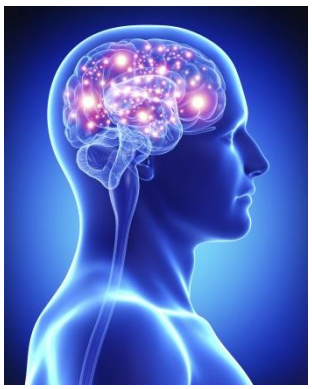
The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

NUC case study

Medical consultancy with Johnson & Johnson – Professor Roger Bayston

Professor Roger Bayston, from the School of Medicine at The University of Nottingham, has helped revolutionise the treatment of a life threatening medical condition through his consultancy with neurosurgical device manufacturer Codman.

Professor Bayston, an expert in surgical infection, has worked closely with the Johnson & Johnson firm for almost three decades. This long-standing consultancy agreement has led to the successful commercialisation of a technology which greatly improves the treatment of Hydrocephalus (fluid in the brain).



Hydrocephalus is characterised by the excessive build-up of cerebrospinal fluid in the ventricles of the brain. This excess fluid raises pressure inside the head and can cause brain damage if the condition is not promptly treated.

The condition is usually treated using a piece of equipment known as a shunt- a thin tube that is surgically implanted in the brain and used to drain away the excess fluid to another part of the body. Unfortunately shunt treatment has a very high infection rate (up to 15%), which can lead to life-threatening illness and brain damage.

In order to overcome this significant clinical problem, Professor Bayston developed a novel method of modifying the Hydrocephalus Shunt so that it actively fights infection. This was achieved by impregnating the material with antibiotics, preventing bacteria from taking hold when the shunt is implanted in the brain. While a simple idea, it required complex science to achieve a clinically useful product.

Codman, seeing the potential benefits of Professor Bayston's technology, licensed the product and began the lengthy process towards commercialisation. Professor Bayston worked with them throughout this process – advising on all aspects of product development and providing a crucial clinical perspective. His consultancy offered Codman invaluable expertise into the condition and the potential complications that can arise from it.

The resulting product is having a profound impact upon infection rates associated with Hydrocephalus Shunts; Meta-analysis of clinical trials shows a reduction in infection rates from 12% to just 4%. A 2015 paper reported on

12,500 cases from 287 USA hospitals showed a reduction from 7% to 2.6% in children, another showing a saving for each 100 patients of $128,000 due to infection reduction.

On Professor Bayston's recommendation, Codman have extended the technology to be used in an alternative form of shunt with an even higher rate of infection (up to 25%), with equally impressive reduction in infection (down to 2-3%). Now FDA approved, the product is used in approximately 830,000 patients across 47different countries. In 2013 a report showed a reduction in infection from 24.5% to 4.4% with a saving of $264,000 per 100 patients.

Further development of the technology is continuing, with applications in other devices and catheters at various stages of development. The technology shows particular promise in improving the infection rates associated with catheters used in peritoneal dialysis for patients suffering from kidney failure, and long-term urinary catheters for patients with spinal injury.

Prof Roger Bayston said: "Nottingham University Consultants have made life a great deal easier for me as an academic with clinical interests, not wishing to become a businessman. They have negotiated contracts, given legal advice, and issued and chased invoices, while providing indemnity.

"Consultancy fees are paid directly to NUC, and I have chosen to donate these to the University so that I can use them for research costs and studentships. The University and my division has benefitted from the
financial flexibility that this affords, and from the resulting publications. Through this connection we have been able to make a significant contribution to REF returns including an Impact Statement

Nottingham University Consultants
e: nuc@nottingham.ac.uk
t: +44 (0) 115 951 4613