MEETINGS ROUNDUP360

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On 17th April 2015 on the Norwich Research Park, a meeting on prosthetic joint infection took place. This brought together orthopaedic surgeons, microbiologists, scientists and industry to discuss where we are and possible ways forward. The day was broken down into four sessions: the clinic problem; tackling the problem; the research response; and the industry response. At the halfway stage, the Gwen Fish Lecture was given.

Gwen Fish was a local farmer and patient at the Norfolk and Norwich University Hospital. When she died, she left a large charitable bequest to be used for orthopaedic research. The trustees helped sponsor the day and promote the lecture, the purpose of which is to allow a rising star in the field of prosthetic joint infection to present their work.

The 2015 Gwen Fish lecturer was Dr Laia Fernández-Barat from the University of Barcelona. A biologist by training, she works in Applied Research in Respiratory Diseases at the IDIBAPS-Hospital Clinic of Barcelona. Her research involves porcine models and their use in ventilator-associated pneumonia (VAP). Her PhD focussed on the effect of systemic treatment with linezolid and vancomycin, on the biofilm formation, of endotracheal tubes from pigs with pneumonia caused by methicillin-resistant *Staphylococcus aureus*. The results of this study on the pig model suggested that linezolid may have a protective role for biofilm development. Dr Fernández-Barat is now coordinating a clinical trial in Professor Antoni Tomes' group on intubated humans to determine the effect of systemic treatment on biofilm formation, which represents translational research from her animal work. They are specifically looking at new strategies to prevent biofilm formation on endotracheal tubes. Her lecture outlined her work, and demonstrated transferable themes in prosthetic biofilms.

The clinical problem in prosthetic joints was presented in three talks by Peter Kay, Ian Stockley and David Livermore, looking at the impact on the NHS, clinical practice in a local hospital, and the antimicrobial landscape respectively. David Livermore is a Professor in Medical Microbiology at the Norwich Medical School and the Public Health England lead on antibiotic resistance. He proposed the heretical idea that the newer, more targeted antibiotics should be used for prosthetic joint prophylaxis, and not just reserved for difficult cases of infection.

Tackling the problem was covered by Roger Bayston, Tim Briggs and Mike Reed in talks on the principles of antimicrobial materials designed for clinical efficacy, photodynamic therapy and current and future diagnostics and their limitations. Tim Briggs commented on the results of GIRFT and prosthetic infection, and Roger Bayston, Professor of Surgical Infection at the University of Nottingham, outlined the many factors that need to be considered when introducing materials into patients.

The research response started with a talk by marine biologist Grant Burgess who reported on his work concerning marine bacteria, and their methods for removing biofilms from competitor bacteria. He pointed out that bacteria have been around for three billion years and are rather good at this. He described an endonuclease from *Bacillus licheniformis* that destroys the DNA component of biofilms. If DNA was not a significant component, the endonuclease would not be very effective at dispersing biofilms. He presented an entertaining cartoon film of how the endonuclease worked to destroy a biofilm.

Chris Morris, from the School of Pharmacy at the University of East Anglia, presented his work on the extracellular barriers to the delivery of antibiotics to lung biofilms. He used cystic fibrosis as a model where excess mucin is produced due to poor lung clearance, where the mucin forms the biofilm. This neatly fitted in with Dr Fernández-Barat's Gwen Fish lecture.

Finally, Claire Edwards, a Norfolk and Norwich University orthopaedic surgeon, presented a synopsis of the proposed work from the Norwich Biofilms group.

The final session was conducted by industry, with a series of talks on novel treatments for biofilms. James Shawcross (Accentus Medical), along with the ubiquitous Tim Briggs, discussed work coming out of the RNOH on the silver coating of metal implants. Michael McArthur (Procarta Biosystems) talked about adapting nanoparticulate antibacterials for delivery to biofilms. Heather Fairhead (Phico Therapeutics) covered the development of a new antibacterial agent (SASPject) which defunctions the bacteria's DNA, including plasma DNA, and therefore the bacteria cannot become resistant to it, and Sean Aiken (Biocomposites) presented on stimulants, antibiotics and biofilms. This session really showed that the future is exciting for controlling infection, and countered the alarmist headlines that bacteria with total antibiotic resistance will be coming soon and we will not be able to treat them.

With that, the Norwich Prosthetic Joint Infection Meeting came to a close. It was an inspiring day, notable, in comments afterwards, for how the scientists and clinicians intermingled and did not stay in cliques. The feedback was very positive with many keen to see the event repeated.

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