Frank Reidy Research Center for Bioelectrics Seminar Series

How clean is clean, how dead is dead

Speaker: Prof. Bill Keevil, Southampton University, UK
When: 10:00 am, August 19, 2014
Where: 1st floor conference room, IRP II

Abstract:

Cleaning of surgical instruments is at present validated by chemical testing for protein residues, after which the tend to be visibly inspected and passed for any residue soiling or mechanical failure before being packaged up and sent for sterilisation. However, doubts have been raised over the sensitivity of such biochemical and visual procedures and whether robust infectious agents such as the prion, causing neurodegenerative diseases, pass undetected. The infectious prion agent is associated with amyloid plaque formation in the brain or spleen and is transmissible in dura mater grafts, blood etc; it is highly robust and has been shown to remain infectious even after modern cleaning and inactivation regimes such as autoclaving or chemical methods, e.g. formaldehyde gas, have been implemented.

For over 100 years microbiology and the public health have largely relied on the detection of microorganisms by culture using rich agar and broth media. However, many species may have experienced stress e.g. iron sequestration in the host or environment, exposure to host defences, solar irradiation, desiccation, oligotrophic environments, disinfectants *in vitro* and antibiotics *in vivo*. Non-spore formers adapt their physiology to one of several increasingly severe stress states, requiring careful resuscitation, or a viable but nonculturable (VBNC) state where resuscitation proves difficult although species remain metabolically active and capable of infection in amoebae or higher organisms. This presentation describes recent microscopy and biochemical techniques measuring cell membrane integrity, respiration, energy generation and cell growth, as well as eukaryote infectivity, that shed new insight into the importance of the VBNC state in mono and polymicrobial communities. It is clear that there are frequent false negative culture detection reports which have profound implications for waterborne or foodborne pathogen control and epidemiology, and prophylactic or therapeutic disease management.

Biosketch:

Dr Keevil is Chair in Environmental Healthcare and Director of the Environmental Healthcare Unit. He obtained a PhD in Biochemistry from University of Birmingham, UK and is Fellow of Royal Society of Medicine, Fellow of American Academy of Microbiology; Fellow of the Society of Biology; Fellow of the World Innovation Foundation.