PS01.26

A mouse model for chronic fungal and poly-microbial osteomyelitis

Cecilie Christiansen(1,2), T Bjarnsholt(1,2), M Shirtliff(3), N Høiby(1,2), S Eickhardt(1,2)

(1) Costerton Biofilm Center, Panum, The University of Copenhagen, Denmark
(2) The Department of Clinical Microbiology, Rigshospitalet, Copenhagen, Denmark
(3) The Department of Microbial Pathogenesis, The University of Maryland, USA

The objective of this study was to develop a model for chronic multi-species osteomyelitis and implantitis caused by biofilm formation. Osteomyelitis and implant infections are severe diseases, which cost the healthcare system millions of dollars each year. Between 1 and 10% of all implants are removed because of infection. With a general population of increasing age and both medical and technological advances, the amount of implant surgeries is estimated to increase dramatically over the next decades. The most common causative agents are Gram-positive bacteria like S. aureus. A more rare cause of implantitis and osteomyelitis are fungi, in particular the Candida species. While very rare, it often affects patients with compromised immune systems causing severe morbidity and high mortality rates. Because of the lack of animal models, treatment regimes are often based on previous cases and experiences. The method used is based on an existing murine model. Infected and non-infected implants in the form of metal pins were inserted into the tibia of mice to simulate chronic osteomyelitis with C. albicans and S. aureus. The results show that establishment of at least 10 day chronic multi-species osteomyelitis is possible in a murine model. This is without the use of immune suppressants to sustain the infection. Furthermore, we show that C. albicans and S. Aureus appear to have a synergistic effect on each other and the pathology of the disease. The long-term chronic multi-species osteomyelitis and implantitis model can be used to evaluate treatment regimes.

PS01.27

Assessing synergistic interaction between Gardnerella vaginalis and other urogenital pathogens

Joana Castro(1,2), D Machado(1), N Cerca(1)

(1) Centre of Biological Engineering (CEB), Laboratory of Research in Biofilms Rosário Oliveira (LIBRO), University of Minho, Campus de Gualtar, Braga, Portugal
(2) Instituto de Ciências Biomédicas Abel Salazar (ICBAS), University of Porto, Porto, Portugal

Bacterial vaginosis (BV) and urinary tract infections (UTIs) are among the most common disorders in women affecting hundreds of millions each year. UTIs occur when pathogenic bacteria ascend from the vagina and replicate on/or within the bladder uroepithelium. Gardnerella vaginalis (Gv) is the most frequent microorganism found in BV, while other bacterial species, namely, Escherichia coli (Ec), Enterococcus faecalis (Ef) and Staphylococcus saprophyticus (Ss) are the most frequent pathogens found in UTIs. This study aimed to characterize the interactions between Gv and Ec, Ef, or Ss using a dual-species biofilm assembly, consisting in combination of species: Gv/Ec, Gv/Ef and Gv/Ss. Biofilms were grown in microtiter plates for 48 hours, and quantified using the crystal violet assay and fluorescence in situ hybridization (FISH) method. Our results showed that G. vaginalis enhanced biofilm formation in the presence of urogenital pathogens. However, the relative abundance of the species varied remarkably in different combinations of dual species. Moreover, visualization of dual-populations species in the biofilm, using the epifluorescence microscopy, revealed that all of the urogenital pathogens co-existed with G. vaginalis. In conclusion, our work suggest that different species can co-operatively form mature biofilms in vagina, but that the behavior of the species within the biofilm may vary due to interspecies interactions. Thus, this study contribute to our understanding the progression of the urogenital disorders. This work was co-funded by FCT project RECI/BBB-EBI/0179/2012 (FCOMP-01-0124-FEDER-027462), FCT Strategic Project PEst-C/SAU/UI0709/2011 and by QREN, FEDER, ON2 project (NORTE-07-0124-FEDER-000027).