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Development of in vitro skin models to investigate the effect of biocidal agents on skin infectionsBeleid G¹, Shepherd J², Miller K¹ and Le Maitre CL¹¹Sheffield Hallam University, UK²University Sheffield, UK

The management of wound infections presents a challenge to healthcare authorities both in terms of economic burden (Chan, B., et al 2017, Nussbaum SR M, et al 2017) and the need to reduce the use of antibiotics due to the rising global crisis of antibiotic resistance (Ventola, 2015). This has led to the search for alternative approaches. Previous studies have shown that ultrasound used in conjunction with antibiotic therapy is more effective than antibiotic treatment alone in reducing bacterial load (Guirro, 2016, Yu, et al 2012). This study developed a 3D skin model utilizing HaCaT cells and fibroblasts which were seeded onto de epimerized dermis (DED) This model was then subjected to a controlled burn and infected with *S. aureus*. Effects of free radical generating antimicrobial strategies (Maillard, 2002): Low-frequency ultrasound (LFU); Silver nitrate; 2-methyl-4- isothiazoline-3-one and Medical Grade Manuka honey were investigated. The cellular phenotype and toxicity of biocidal agents on mammalian and bacterial cells were investigated. 3D skin was generated which demonstrated keratinocyte (Cytokeratin 10 &14) and fibroblast (S100A4) markers and underlying collagen type IV in the DED skin layer. In Bacterial biofilms, there was marked inhibition of *S. aureus* (SH1000), *P. aeruginosa* (NCIMB 8295), *S. epidermidis* and MRSA growth with all biocides. A decrease in *S. aureus* (SH1000) bacteria viability and number of CFU were observed in infected tissue-engineered skin models. This study describes the development of a well characterized skin model which can be utilized to develop and test biocidal agents for skin infections.

Biography

Guma Beleid graduated from the Faculty of medical technology, Derna, Libya, with Bsc in Laboratory medicine and MSc in Clinical Microbiology from Academy of Graduate Studies, Tripoli, Libya. He worked as a lecturer assist in the Faculty of medical technology, Derna, Libya for four years. He is currently a PhD Student in the Biomolecular Sciences Research Centre at Sheffield Hallam University, Sheffield, UK.

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