

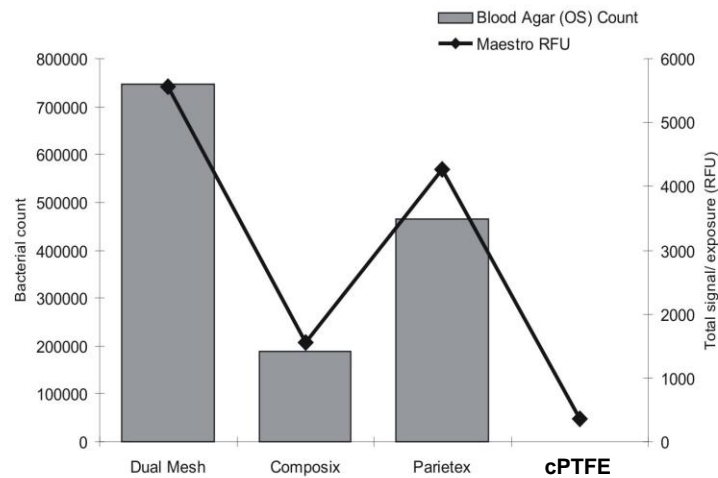
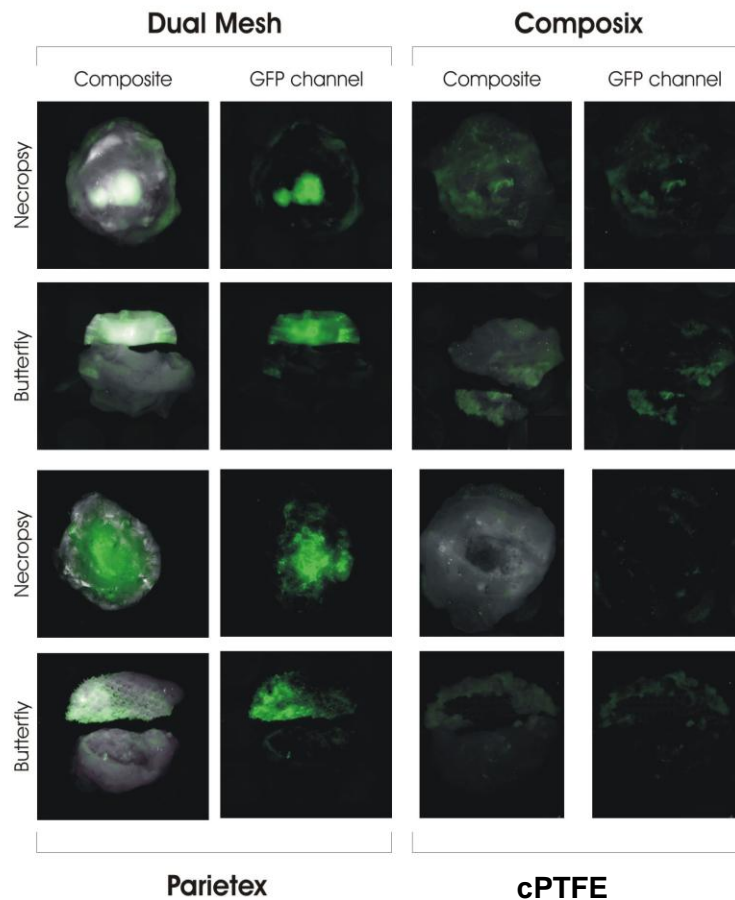
Title: MACROPOROSITY AND HYDROPHOBICITY OF SURGICAL MESHES REDUCE IN VIVO STAPHYLOCOCCUS AUREUS INFECTION AND ANCHORAGE

Background/Aims: Despite the use of aseptic techniques and antibiotic prophylaxis following hernia repair, mesh infections continue to occur. This study compared the susceptibility to infection by GFP-labeled *Staphylococcus aureus* (GFP-SA) of different meshes in a chronic hernia rat model.

Methods: Sprague Dawley rats underwent hernia induction through linea alba without fascial closure. After 4 weeks and development of a chronic hernia, repair in an underlay fashion was performed using (n=8/mesh): DualMesh® (DM, microporous, expanded poly(tetra fluoro)ethylene - ePTFE), cPTFE (MM, macroporous, compressed PTFE), Parietex™ (PX, macroporous, polyester+collagen), and Composix® (CX, macroporous, poly(propylene)). Prior to skin closure, 4 animals/mesh received 1×10^8 CFU/ml of GFP-SA uniformly released over the exposed surface of the mesh, the rest were controls. The presence and location of GFP-SA infection was monitored using *In Vivo* Maestro Imaging. GFP-SA (GFP channel) of each mesh was quantified through the GFP-channel by background subtraction (Composite). The animals were sacrificed 7 days later, and the following analyses were performed:

- Evaluation of surface adhesions,
- GFP-SA imaging,
- Bacterial release from mesh through sonication and blood agar plating,
- Histometric scoring of host tissue response.

Results: All infected-meshes displayed a similar extent of surface adhesions (score= $2.4 \pm 0.6/3$). Maestro imaging revealed dramatic differences in the expression and adhesive qualities of GFP-SA on the various meshes. Necropsy of the tissue with embedded mesh showed that DM and PX expressed the greatest amount of GFP-SA compared to CX and MM (Necropsy). When the tissue and mesh were separated, GFP-SA remained associated with the DM and PX meshes (Butterfly). GFP-SA was virtually absent on MM (Necropsy and Butterfly). The GFP-fluorescence observed correlated with the blood agar bacterial counts (Graph). All GFP-SA meshes displayed a similar inflammatory response (score= $0.6 \pm 0.3/3$), compared to controls (score=0 baseline).



Conclusions: MM displayed the least bacterial anchorage, thus, establishing that macroporosity and hydrophobicity represent critical mesh design parameters instrumental in the significant reduction of bacterial infection and anchorage.

Disclosure

G. Voskerician is a full time employee of Proxy Biomedical Limited.