**Abstract**

Benzanthonium chloride (BTC) is a quaternary ammonium compound (QAC) that is used as an antibacterial in several applications. BTC can be complexed with laponite clay (Bioclay) particles, making it capable of being applied and retained topicaly. Once complexed, BTC cannot be easily leached out of the clay by diffusion due to strong interactions with the clay surface. Bioclay has a wide range of potential applications for imparting antimicrobial activity in medical, industrial, and household applications. Bioclay has been previously shown to be effective against methicillin resistant Staphylococcus aureus (MRSA), and has been developed in cream form for topical application as an antiseptic cream. This study investigates the hypothesis that BTC, when incorporated into a pharmaceutical grade colloid, can enhance the process of wound healing. This is done using an in vitro wound healing model utilizing a variety of cell lines. WI3B cells are normal diploid human fibroblasts. TM12 and TM12T are immortalized mammary epithelial cell lines; TM12T is a derivative of TM12 and has undergone epithelial to mesenchymal transition. The first study utilized the TM12 cells which were treated with BTC or Bioclay. The wound width was measured after 24 hours of incubation, the TM12 control group averaged 78.4% wound healing. The TM12 MTT assay shows a slight decrease in cell viability as the BTC concentration increased, but TM12T cells were less sensitive to BTC concentrations on the purified colloid cell line. The second study utilized the WI3B cells, which tend to maintain cell to cell connections after being scraped in order to induce the wound and as an attempt to prevent cells from falling back into the wound before the different media were added. All of the groups were compared using one way ANOVAs with a p-value of at most 0.005. All of the other groups are statistically similar.

**Results**

**Discussion**

- There was no enhancement of wound healing responses in either WI3B or TM12T cells by BTC or Bioclay.
- There was no difference in wound healing between the BTC and Bioclay groups for any of the cell lines used.
- The TM12 cell line was more sensitive to the BTC and Bioclay than the TM12T cell line.
- WI3B fibroblast viability was more sensitive to Bioclay than BTC alone as seen in the viability assay.
- At higher concentrations of BTC there was a slight loss of cell viability in TM12 cells, but TM12T cells were less sensitive to BTC than the TM12 cell line.

**References**