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Abstract Title:	**Cerium(III) Nitrate Containing Electrospun Dressing For Mitigating Infection And Burn Severity**
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Objective:	1) Describe the role of cerium(III) nitrate on burn injuries. In particular, the work herein examines the viability of electrospinning for the delivery of cerium(III) nitrate in a nonwoven fiber burn dressing. 2) Identify the various parameters for electrospinning cerium(III) nitrate, and the resulting loading capacity and release kinetics. 3) Incorporate cerium(III) nitrate in an electrospun burn dressing.
Abstract:	**Introduction:** Thermal injuries pose a significant risk for service members in extended/prolonged field care situations. Without access to prompt surgical interventions and standard burn treatments, potentially-salvageable tissues are compromised, resulting in an increase in both the wound size and depth (i.e. progression). Immediate debridement of dead tissue greatly enhances survivability and mitigates the risks of burn shock, multiple organ failure, and infection due to compromised skin barriers and impaired immune responses. However, due to the difficulty of surgical removal of the burn eschar in prolonged field care situations, it is of utmost importance to develop alternative methods for the stabilization of the burn area. Studies have indicated that cerium(III) nitrate may be used to prolong the time before surgical intervention is required. The objective of this study is to incorporate cerium(III) nitrate into an electrospun dressing that will provide both burst and sustained release, and protect the wound area from bacteria. **Methods:** Select dosages of cerium(III) nitrate were dissolved with either polyethylene oxide (PEO) or poly(l-lactic acid) (PLGA), which generate a burst and sustained release, respectively. The resulting solutions were coaxially electrospun onto a grounded rotating mandrel, resulting in a combined nonwoven mesh, and then compared to traditionally (non-coaxially) spun solutions. Dressings were evaluated for topography, morphology, and porosity using scanning electron microscopy, helium pycnometry, and a gas exchange chamber, respectively. Additionally, cerium(III) nitrate loading efficiency release rates were evaluated for up to 72 hours in both static and dynamic environments, and dressing stability was evaluated over 60 days at both 25oC and 37oC. Finally, zone of inhibition (ZOI) studies were conducted

	on dressings and a chitosan/PEO based dressing against both Methicillin-resistant Staphylococcus aureus and Pseudomonas aeruginosa. **Results:** Imaging showed randomly aligned polymer nanofibers with fiber diameters of 1161 ± 200 nm and 1090 ± 250 nm for traditionally and coaxially spun PEO/cerium(III) nitrate dressings, respectively, and 324 ± 110 nm and 44.7 ± 22.2 nm for traditional and coaxial spun PLGA/cerium(III) nitrate dressings, respectively. Additionally, traditionally spun PEO and coaxial spun PEO scaffolds had porosities of 49.0% and 36.1%, respectively. Conversely, traditionally spun PLGA scaffolds and coaxial spun PLGA scaffolds had porosities of 81.4% and 67.4%, respectively. Assay results indicated that the electrospun dressings contained functional cerium(III) nitrate properties with coaxial spun dressings containing three times the amount of cerium nitrate as their traditionally spun counterparts. Release studies revealed that PEO based dressings released the entirety of their contents within the first hour. Finally, the coaxial PEO/cerium(III) nitrate dressing showed a dose-dependent ZOI for both bacterial strains. **Conclusions:** The study herein shows the successful incorporation of cerium(III) nitrate in an electrospun dressing, and its effectiveness on mitigating infection in vitro. Studies to investigate both the scale-up production of the cerium(III) nitrate dressings and their effects on cell viability in an ex vivo model are ongoing.
Disclosures:	Cortes Williams – No relevant financial relationships to disclose. Ramanda Chambers-Wilson – No relevant financial relationships to disclose. Luis Martinez – No relevant financial relationships to disclose. Jahnabi Roy – No relevant financial relationships to disclose. Christine Kowalczewski – No relevant financial relationships to disclose. Angela Jockheck-Clark – No relevant financial relationships to disclose. Robert Christy – No relevant financial relationships to disclose.