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Abstract Title:	**Alterations in Clock Gene Expression after Burn and Trauma**
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Objective:	Upon completion of the lecture, attendees should be better prepared to: • Examine the changes in CLOCK gene expression after burn and trauma injury
Abstract:	**Introduction:** The human circadian clock system is responsible for regulating a wide range of physiologic and behavioral processes. Disturbances in the expression of clock genes have been found in numerous disease processes including diabetes, infections, cancer, traumatic brain injury, and immune dysfunction. We proposed to examine the changes in clock gene expression after burn and trauma in a specific subset of clock genes, including Aryl hydrocarbon receptor nuclear translocator-like protein 1 (ARNTL), Circadian Locomotor Output Cycles Kaput (CLOCK), and period circadian protein homolog 3 (Per3). We hypothesized that injury will result in significant alterations in clock gene expressions. **Methods:** Whole-blood was collected from three male burn (age 34-38 years, TBSA 28-40%) and three male trauma patients (age 19-35, ISS 41-45) at 10 AM (morning) and 10 PM (evening) daily for one week after injury. The whole-blood expression of the molecular clock components ARNTL, CLOCK, and PER3 was assessed using quantitative real-time polymerase chain reaction using GAPDH expression as reference gene. Time-matched healthy volunteers were used as controls. **Results:** Burn (B) and trauma (T) patients, when compared to healthy controls (HC), showed a similar decrease in expression of ARNTL (average ΔCT 6.78 [B] vs. 6.2 [T] vs. 4.36 [HC], $p<0.01$), CLOCK (8.27 [B] vs. 7.85 [T] vs. 5.29 [HC], $p<0.01$), and PER3 (13.35 [B] vs. 12.8 [T] vs. 5.96 [HC], $p<0.01$) at the morning time-point. At the evening time-point, the burn patients also exhibited a significant decrease in expression of clock genes as compared to healthy controls. Both burn and trauma patients had an approximate 56% and 54% decrease in the expression of PER3, respectively, at both time points when compared to healthy volunteers. **Conclusions:** After burn and trauma, the molecular clock genes, ARNTL, CLOCK, and PER3 are altered when compared to controls. However, the most significant change was a decrease of 56% in PER3, which has been identified as the primary circadian pacemaker in the central nervous system. As compared to burn and control patients, trauma patients showed more variability in clock gene expression between the

	morning and evening measurements. Burn patients showed a greater decrease of clock gene expression as compared to trauma and control patients in both the morning and evening. **Applicability of Research to Practice:** Recent advances in science have provided a clear understanding of the importance of clock gene regulation in human health. A better understanding of clock gene regulation following traumatic injury may provide the clinician with better information to time therapies and improve outcomes in this population.
Disclosure:	Maryanne L. Pickett – No Relevant Financial Relationships to Disclose Audra Clark – No Relevant Financial Relationships to Disclose Michael Cripps – No Relevant Financial Relationships to Disclose Herb Phalen – No Relevant Financial Relationships to Disclose Steven Wolf – No Relevant Financial Relationships to Disclose