Abstract Submitted
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Osteogenic differentiation of periosteum-derived stromal cells in blast-associated traumatic loading[1] DAVID R SORY, The Centre for Blast Injury Studies/ Institute of Shock Physics/ Imperial College London, HARSH D AMIN, SARA M RANKIN, The Centre for Blast Injury Studies / National Heart and Lung Institute / Imperial College London, WILLIAM G PROUD, The Centre for Blast Injury Studies/ Institute of Shock Physics/ Imperial College London — One of the most recurrent medical complications resulting from blast trauma includes blast-induced heterotopic ossification. Heterotopic ossification refers to the pathologic formation of extraskeletal bone in non-osseous tissue. Although a number of studies have established the interaction between mechanics and biology in bone formation following shock trauma, the exact nature of the mechanical stimuli associated to blast-loading and their influence on the activation of osteogenic differentiation of cells remain unanswered. Here we present the design and calibration of a loading platform compatible with living cells to examine the effects of mechanical stress pulses of blast-associated varying strain rates on the activation of osteogenic differentiation of periosteum (PO) cells. Multiaxial compression loadings of PO cells are performed at different magnitudes of stress and ranges of strain rate. A proof of concept is presented so as to establish a new window to address fundamental questions regarding blast injuries at the cellular level.

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David Sory
CBIS - Imperial College London

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