Effects of strain rate and load on biological systems for blast injury studies

DAVID R SORY[1], ANABELA CEPA-AREIAS(2)[2], DARRYL R OVERBY[2], PROF SARA M RANKIN[3], WILLIAM G PROUD[1]

Abstract: *In the last few decades, improvised explosive devices have been reported as one of the most important causes of injuries on the battlefield. Numerous experimental and modelling efforts have been focussed on blast injury at the organ or tissue level, however, few studies have investigated the mechanisms of blast injury at the cellular level. There remains a need to understand the detailed acute and post-traumatic pathologies associated with blast and traumatic injuries produced on a cellular level. This presentation introduces the development and use of controlled experimental platforms to interrogate the effects of high stress and short-duration pulses similar to those observed in blast waves. Computational simulations on FEA software are used to complement the experimental measurements in order to understand the loading conditions experienced by the sample.*

Acknowledgements: *The Institute of Shock Physics acknowledges the support of AWE, Aldermaston, UK and Imperial College London. The Centre for Blast Injury Studies acknowledges the support of the Royal British Legion and Imperial College London.*

Keyword: *Split-Hopkinson pressure bar, blast injury studies, compression, cellular behaviour.*

1 Institute of Shock Physics and Royal British Legion Centre for Blast Injury Studies, Imperial College London, Prince Consort Road, London SW7 2AZ, UK.
2 Department of Bioengineering and Royal British Legion Centre for Blast Injury Studies Department of Bioengineering, Imperial College London, London, SW7 2AZ, UK.
3 National Heart and Lung Institute and Royal British Legion for Blast Injury Studies, Faculty of Medicine, Imperial College London, SW7 2AZ, UK.
contact: d.sory14@imperial.ac.uk