Blast wave transmission through the thorax and the effects on structures within the lung

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Abstract: *Blast lung occurs in people who are hit by a blast wave in either combat or civilian settings/scenarios. The impact on the human can cause significant, immediate damaging changes to the lungs and therefore the victim's survival rates. The exact mechanisms of injury development have not been elucidated. Rapid death in patients with no obvious external signs of fatal injury is still an incompletely understood phenomenon.*

The aim of this research is to understand the nature of the injury from a mechanical, biological and physiological perspective in order to develop methods to mitigate lung damage and to identify possible therapeutics to treat this clinical pathology.

The research will focus on two main areas: the mechanical aspects of blast wave interaction with tissue and the mechanical behaviour of lung tissue before, during and after blast; and biological aspects, which include understanding any alterations to the physiology as a result of blast at both a microscopic and macroscopic level.

Induced stresses within the lungs from shock tube experiments will be quantified to understand how different shock wave profiles can affect the structural response. This information will contribute in improving clinical practice as well as designing suitable protective armour.

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