

Liver plays role in pneumonia, sepsis susceptibility

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New evidence highlights the importance of the liver in immunity against bacterial pneumonia. The study is the first of its kind to directly show such a link between liver-produced molecules and pneumonia susceptibility during sepsis.

Led by researchers at Boston University School of Medicine (BUSM), the study appears in the journal *Infection and Immunity*.

Pneumonia, according to the World Health Organization, is the leading infectious cause of death in children worldwide, taking more than 900,000 lives of children under the age of 5 in 2013 alone. Pneumonia, in both children and adults, is frequently associated with [sepsis](#), which is the body's own inflammatory reaction to becoming infected.

In order to model the common clinical scenario of sepsis followed by [pneumonia](#), models were systemically treated with a bacterial product (eliciting a sepsis-like response) followed hours later by a live bacterial challenge in the lungs. One group had completely normal livers, and the other lacked a gene in their livers that prevented maximal [liver](#) activation. The researcher found the group lacking a complete liver response was more likely to succumb to pneumonia, exhibiting a significantly compromised immune response in both the lungs and blood, where more bacteria survived.

According to the researchers there is a well-established link between pneumonia and sepsis, such that both increase the likelihood of the

other. Both also activate the liver to initiate what is known as the acute phase response, an event leading to the liver's production of acute phase proteins that change in the blood "These proteins are frequently used as clinical biomarkers, but their combined biological significance is mostly speculative. However, the results of this study directly suggest that liver activation is required to maintain adequate immune responses in the lungs," explained corresponding author Lee J. Quinton, PhD, associate professor of medicine and pathology at BUSM.

While it may be too early to immediately speculate on the applications of these findings, the authors believe that liver activity may serve as a previously unappreciated window into pneumonia defense/susceptibility. "A better understanding of how these distinct organs collaborate to mount immune responses has important clinical implications for patients with or at risk for pneumonia and sepsis. The idea that non-lung tissue could be targeted for treatments of lung disease is compelling," added Quinton.

Provided by Boston University Medical Center

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