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Scientists identify 'first responders' to bacterial invasion

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When bacteria enter our body, they kick-start a powerful immune response. But this chain of reactions doesn't fully account for our immediate responses. Researchers at KU Leuven, Belgium, show that so-called ion channels play a key role as 'first responders'.

When we get a bacterial lung infection, the cells lining our airways are the first line of defence. These cells recognise the lipopolysaccharide molecules typically found on many bacteria, including the ones causing pneumonia. This gives immune cells the signal to start attacking the invading bacteria. But powerful though this immune response may be, it's relatively slow and doesn't fully account for many of our body's immediate reactions, including inflammation and fever.

Researchers from the KU Leuven Department of Cellular and Molecular Medicine have now identified a rapid response mechanism against bacterial airway infections. The team led by Professor Karel Talavera Pérez and Dr Yeranddy Aguiar Alpizar found that the lipopolysaccharides also activate specific ion channels in the cells lining our airways.

Ion channels are selective gates through which charged atoms enter and leave the cell. In the case of lung infections, the activated ion channels open to let calcium flow in. This, in turn, triggers a wide range of antibacterial responses in a matter of minutes.

"Our study shows that our body's strategy to fight off bacterial infections

is not limited to previously identified immune pathways," Professor Talavera explains. "So-called TRPV4 ion channels play a role as well: they are essential to our body's earliest defence mechanism against bacterial invasion. If we want to develop more effective treatments, these ion channels are well worth investigating in greater detail."

More information: Yeranddy A. Alpizar et al, TRPV4 activation triggers protective responses to bacterial lipopolysaccharides in airway epithelial cells, *Nature Communications* (2017). DOI: 10.1038/s41467-017-01201-3

Provided by KU Leuven