

New channels for antibacterial therapies to combat respiratory infections

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A study led by the Agrobiotechnology Institute (IdAB) used a pioneering methodology to identify bacterial components involved in the infection by a pathogen that colonises the respiratory tracts of people with COPD (chronic obstructive pulmonary disease). This discovery, which is the outcome of work in collaboration with three North American universities, will enable development of antibacterial therapies that can be applied in respiratory infections.

The study has developed a pioneering methodology to analyse the genetic bases of pathogenic bacteria and can be used to identify therapeutic targets in order to develop new antimicrobial agents. The potential of this methodology, known as TREP (Transformed Recombinant Enrichment Profiling), lies in "its huge capacity to rapidly identify bacterial virulence factors, which are the mechanisms a microorganism relies on to enter the human body, invade tissues and cause disease and which can subsequently be used as antimicrobial targets," says Junkal Garmendia-García, leader of the study.

This work has applied the TREP methodology to the genetic architecture of the intracellular invasion caused by the respiratory pathogen *Haemophilus influenzae*, which colonises the airways of chronic respiratory patients and which is associated with the prolonged worsening of COPD symptoms. "This pathogen invades the respiratory epithelium, which is the tissue that lines the [respiratory tract](#), and acts as a protective barrier of the airways, and the infection it causes escapes the immune response and therapeutic intervention during the chronic

infection," explained Junkal Garmendia. "Thanks to that the pathogen persists."

Haemophilus influenzae pathogen not only invades the epithelial tissue; individual bacteria also stick to each other and thus form groups or microcolonies. "On balance, the study identifies bacterial elements the blocking of which could interfere in the invasion of the pathogen, which, in turn, would presumably increase antibiotic effectiveness in combatting the [respiratory infection](#)," says Junkal Garmendia.

Other respiratory pathogens

The TREP [methodology](#) can be applied to a broad range of bacterial species including, among others, the respiratory [pathogens](#) Streptococcus pneumoniae (which causes pneumonia, sinusitis, etc.) and Moraxella catarrhalis (which causes otitis, bronchitis, sinusitis and laryngitis), along with Haemophilus influenzae.

The work, published in the journal *PLoS Pathogens*, was carried out by international researchers of the Drexel and Pennsylvania Universities (both in the United States) and the University of British Columbia (in Canada).

More information: Joshua Chang Mell et al, Transformed Recombinant Enrichment Profiling Rapidly Identifies HMW1 as an Intracellular Invasion Locus in Haemophilus influenzae, *PLOS Pathogens* (2016). [DOI: 10.1371/journal.ppat.1005576](https://doi.org/10.1371/journal.ppat.1005576)

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