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Cell death discovery could lead to new treatment for COPD

Research shows that inhibiting necroptosis, a form of cell death, could be a novel therapeutic approach for treating chronic obstructive pulmonary disease (COPD), an inflammatory lung condition, also known as emphysema, that makes it difficult to breathe.

Published in the prestigious 'American Journal of Respiratory and Critical Care Medicine', the study by a team of Australian and Belgian researchers, revealed elevated levels of necroptosis in patients with COPD.

By inhibiting necroptosis activity, both in the lung tissue of COPD patients as well as in specialised COPD mouse models, the researchers found a significant reduction in chronic airway inflammation as well as damage to the lung.

Professor Phil Hansbro, Director of the Centenary UTS Centre for Inflammation who led the research team, said that necroptosis was a form of cell death known to drive tissue inflammation and destruction.

"Necroptosis, apoptosis and necrosis are all forms of cell death but they operate in distinctly different ways. Significantly, in necroptosis, a cell bursts, dispersing its contents into nearby tissues resulting in an immune and inflammation response."

"Our research suggests that inhibiting necroptosis and preventing this inflammation response may be a new therapeutic approach to treating COPD," said Professor Hansbro.

Joint first author on the study, Dr Zhe Lu, a researcher at the University of Newcastle, said that their study was the first of its type to be able to distinguish between the roles of necroptosis and apoptosis in COPD.

"Necroptosis is generally pro-inflammatory. Apoptosis, however, tends to be non-inflammatory as it's a more ordered form of cell death—a cell self-degrades as opposed to bursting and there's no leakage of cell contents. This may explain why, in our study, it's the inhibition of necroptosis and not apoptosis that reduces lung damage and COPD associated inflammation," said Dr Lu.

A debilitating respiratory condition and a leading cause of death worldwide, there are currently no treatments that halt or reverse the progression of COPD.

"Our research suggests that it is the type of cell death associated with COPD that is important and that the development of new drugs that can interfere or intervene in the necroptosis process could be a new targeted therapy for this common lung disease," said Professor Hansbro.

The study was led by researchers from the Centenary Institute, University of Technology Sydney, University of Newcastle and Ghent University Hospital, Belgium.

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Publication:

Necroptosis Signalling Promotes Inflammation, Airway Remodelling and Emphysema in COPD. American Journal of Respiratory and Critical Care Medicine.

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Images:

Professor Phil Hansbro

<https://drive.google.com/file/d/1gEJwBISJ2m-NtEVOijfJJSqKIZC7IhbB/view?usp=sharing>

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About the Centenary Institute

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