Novel Therapies in Bronchiectasis: What's in the Pipeline?

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Educational background

1992-1995	Postdoctoral Research Fellow, Cardiovascular Research Institute (Prof. Jay A. Nadel), University of California, San Francisco, USA
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Professional experience

2025-Present	Dean, Yokohama City University School of Medicine
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Since the 2018 report by the Severe Asthma Research Program (SARP), a U.S.-based cohort study of severe asthma, revealed that mucus plugs are frequently present in the central airways such as subsegmental airways (medium-sized airways) during the stable phase of asthma and are closely associated with its pathogenesis, interest in airway mucus secretion has grown significantly. Mucus plug formation has been shown to negatively correlate with lung function and contribute substantially to airflow obstruction. Patients with prominent mucus plug formation typically exhibit a clinical profile characterized by Type 2 inflammation, including elevated peripheral blood eosinophil counts, increased fractional exhaled nitric oxide (FeNO) levels, and frequent exacerbations accompanied by severe airflow obstruction and high disease severity. In these patients, an increased eosinophil ratio in sputum and upregulated gene expression of IL-5 and IL-13 in sputum cells have been observed. Consequently, therapeutic strategies targeting these cytokines—along with thymic stromal lymphopoietin (TSLP), which promotes their production via ILC2 activation—are considered promising. Currently, the mucus score is used to assess mucus plug formation. However, this method is time-consuming and challenging to apply broadly in daily clinical practice, as it requires detailed observation and evaluation of the bronchi in each lung segment using multidetector computed tomography (MDCT) images. To overcome this limitation, we are exploring the use of a three-dimensional (3D) airway tree, automatically generated from MDCT data using a 3D image analysis system (SYNAPSE VINCENT; Fujifilm Corporation), to facilitate the identification and assessment of mucus plugs. In this presentation, I will review the underlying mechanisms of mucus plug formation in asthma, highlight emerging imaging techniques currently under investigation, and explore therapeutic strategies involving biologic agents.