Association of MYH10 with clinical variables in obstructive lung diseases

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To the Editor:

A definitive diagnosis is crucial for distinguishing between asthma and COPD and ensuring proper treatment [1]. Currently, active areas of research include airway remodelling, structural destruction and fibrosis, aimed at overcoming and delaying lung diseases such as asthma and COPD.

Non-muscle myosin II (NMII) motor complexes are key regulators of actin cytoskeletal dynamics, playing roles in cell division, migration, polarity, morphology, adhesion and various other processes [2]. Non-muscle myosin heavy chain IIB (MYH10) is known to mediate centrosome reorientation during cell migration and is required for efficient ciliogenesis, playing a role in linking apical–basal polarity and microtubule-dependent movements of ciliary components [3]. MYH10 expression was downregulated in the lung of emphysema patients. The role of MYH10 was known in alveologenesis in part *via* the regulation of extracellular matrix remodelling, which may contribute to the pathogenesis of emphysema [4]. To date, there are no data for the relationship of circulating MYH10 and emphysema in asthma and COPD.

At the time of writing, the biological roles and underlying mechanisms of MYH10 in asthma and COPD are largely unknown. In the present study, we examined the association between MYH10 levels and emphysema, as well as clinical profiles in patients with asthma and COPD.

The enrolled patients were adults aged ⩾40 years with a clinical diagnosis of asthma and COPD according to the Global Initiative for Asthma guidelines [5] and Global Initiative for Chronic Obstructive Lung Disease 2015 criteria [6]. The plasma MYH10 concentration was measured using enzyme-linked immunosorbent assay (ELISA; MyBioSource, Inc., San Diego, CA, USA). The protocol and minimum detection limit were based on the manufacturer's recommendations. All patients with asthma and COPD were recruited from the cohort of the Genome Research Center for Allergy and Respiratory Diseases in South Korea. The biospecimens and clinical data were provided by the Biobank of Soonchunhyang University Bucheon Hospital, a member of the Korea Biobank Network. This study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki and was approved by the Institutional Review Board of the Soonchunhyang University Bucheon Hospital (SCHBC_2017-12-013-003).

18 normal controls, 38 asthmatic patients and 44 COPD patients were recruited.

MYH10 levels were higher in patients with COPD compared to those with asthma (figure 1a). Moreover, the prevalence of emphysema in patients with COPD is more prominent compared with those with asthma. MYH10 levels were higher in the presence of emphysema on high-resolution computed tomography (HRCT) compared with emphysema absence in patients with asthma and COPD. Additionally, MYH10 levels correlated with neutrophils, lymphocytes, and forced vital capacity (FVC) % predicted in normal controls and COPD patients (figure 1b). Furthermore, MYH10 levels correlated with body mass index, forced expiratory volume in 1 s (FEV_1) % pred, FVC % pred and FEV_1/FVC in patients with asthma and COPD (figure 1c).

Diagnostic values of MYH10 to distinguish COPD patients from controls are presented (figure 1d). With an optimal cutoff point of 2.454 $ng \cdot mL^{-1}$, MYH10 had a sensitivity and specificity of 0.611 and 0.614, respectively, and the area under the curve (AUC) was 0.723 (p=0.006, 95% CI: 0.575–0.872). The diagnostic values of MYH10 to distinguish COPD patients from patients with asthma are presented (figure 1d). With an optimal cutoff point of 2.3025 $ng \cdot mL^{-1}$, MYH10 had a sensitivity and specificity of 0.727 and 0.737, respectively, and the AUC was 0.792 (p<0.001, 95% CI: 0.683–0.902).

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MYH10 and clinical variables in COPD https://bit.ly/4dFsSGH

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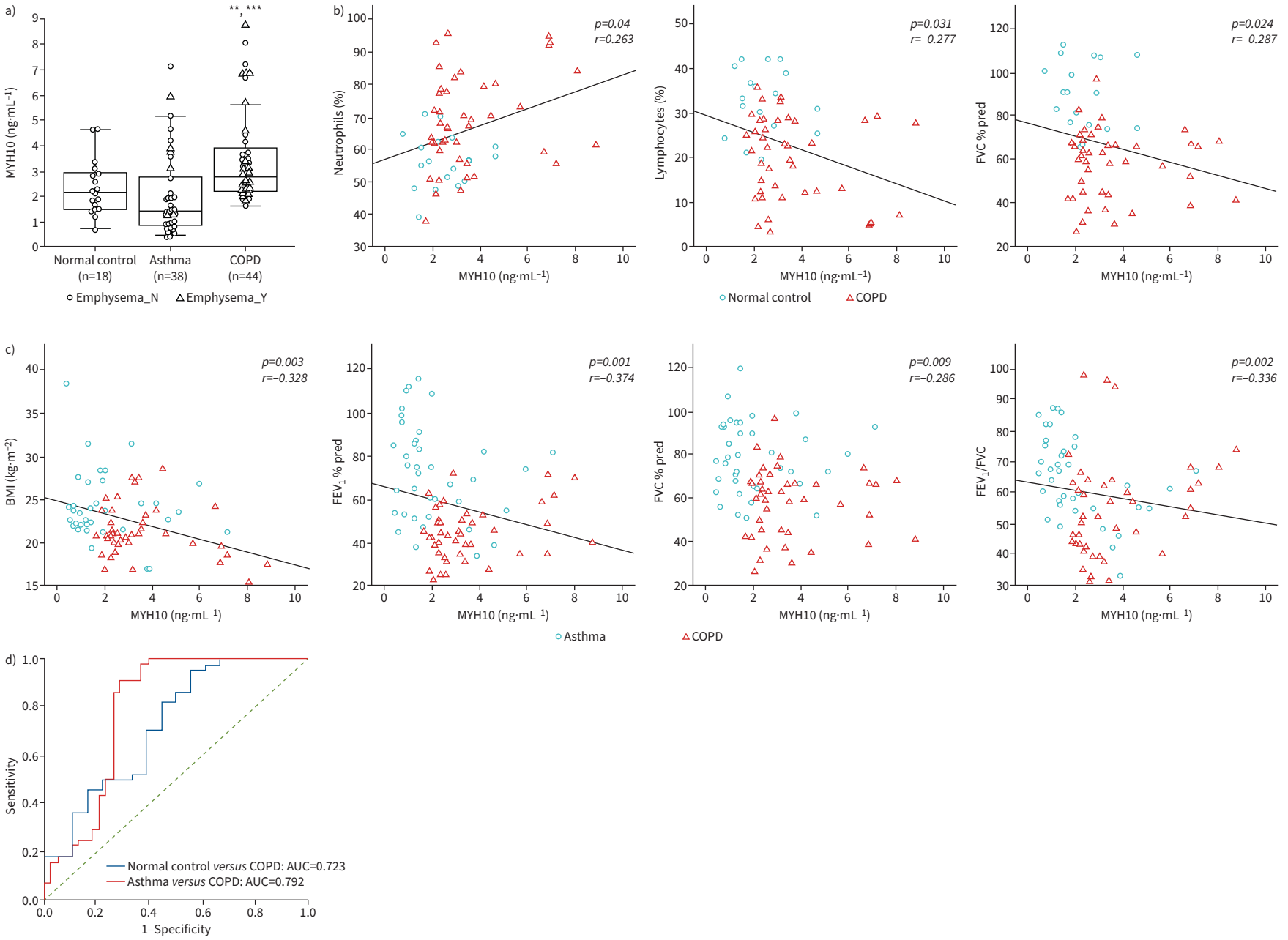

FIGURE 1 a) The MYH10 level in normal controls, patients with asthma and COPD. **: p<0.01 *versus* normal controls. ***: p<0.001 *versus* asthma. b) Relationships of MYH10 with clinical variables in normal controls and COPD patients. c) Relationships of MYH10 with clinical variables in patients with asthma and COPD. d) The ROC curve of the MYH10 protein concentration between the normal controls and COPD patients: a cut-off value of 2.454 pg·mL^{-1} had 57.5% accuracy, 87.2% specificity and 61.1% sensitivity for differentiating between the two groups. Plus, the ROC curve of the MYH10 protein concentration between asthma and COPD patients: a cut-off value of 2.3025 pg·mL^{-1} had 68.3% accuracy, 90.2% specificity and 72.7% sensitivity for differentiating between the two groups. AUC: area under the curve; BMI: body mass index; CI: confidence interval; FEV_1: forced expiratory volume in 1 s; FVC: forced vital capacity; MYH10: myosin heavy chain IIB; ROC: receiver operating characteristics.

Many pulmonary diseases, including asthma and COPD, are associated with significant morbidity and mortality due to impaired alveolar formation and maintenance [7]. Emphysema, a form of COPD, results from the enzymatic destruction of lung extracellular matrix components, including elastin and collagen, leading to the destruction of alveolar walls and airspace enlargement [8].

NMII proteins are highly expressed during lung development [9], and their inhibition using blebbistatin as a cell-permeable, selective and reversible inhibitor of NMII leads to defects in branching morphogenesis and epithelial cell shape and orientation [10]. To date, however, genetic studies of NMII genes during lung development and homeostasis have not been conducted. In this study, the plasma MYH10 level was higher in patients with COPD, especially those whose HRCT had detected emphysema, and correlated with lung function and clinical variables in patients with asthma and COPD. These findings indicate that MYH10 is associated with clinical variables in patients with asthma and COPD.

This study has several limitations. First, the small sample size of lung disease patients included was a constraint. Second, the study primarily focuses on the association between MYH10 and emphysema, but does not explore the mechanistic pathways through which MYH10 contributes to disease progression. Finally, although the data suggest potential clinical relevance, further studies are needed to validate MYH10 as a reliable biomarker for diagnosis and to determine its utility in clinical settings.

In conclusion, the plasma MYH10 level was higher in patients with COPD compared to those with asthma and was related to clinical variables in patients with asthma and COPD. This suggests that MYH10 may be associated with emphysema and clinical variables in asthma and COPD. Further potential next steps to evaluate the clinical utility of MYH10 in influencing the diagnosis, prognosis and clinical management of asthma and COPD should be elaborated.

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