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### Collagen Deposition in Lung Parenchyma Driven by Depletion of LYVE-1+ Macrophages Protects Against Emphysema and Loss of Airway Function

**Abstract:**

Recent studies demonstrated that the specific depletion of LYVE-1+ macrophage in LYVE-1wt/cre; Csf1rflox/flox mice leads to the deposition of collagen in the arterial wall and its stiffening. We hypothesized that LYVE-1+ macrophages may also regulate collagen content in the lung.

Bright field and polarized light microscope were used to estimate the total amount and thickness of collagen, respectively. Immunofluorescent staining and confocal imaging were used to analyze the type of collagen. Sircol collagen assay was also used to support the microscopy results. Gelatin Zymography was used to examine MMP-9 activity. Lung function test was measured by whole-body plethysmograph, which is connected to a computer-controlled ventilator.

Loss of LYVE-1+ macrophages was associated with high amount of collagen in the lung parenchyma and around bronchioles. By using quantitative sircol collagen assay and polarized light microscope we found that LYVE-1wt/cre; Csf1rflox/flox mice have more cross linked collagen compared to the Csf1rflox/flox control mice. The gene expression level of MMP-9 was downregulated in LYVE-1wt/cre; Csf1rflox/flox mice & its activity was also significantly reduced compared to the WT mice as shown by gelatin zymography. Depletion of LYVE-1+ macrophages ameliorate key features of COPD like, bronchial thickening, emphysema & showed improved lung function after 2 months of cigarette smoking.

Our findings suggest that the presence of more collagen in the parenchyma, driven by loss of LYVE-1+ macrophages has protective effect against cigarette smoke induced emphysema.

**Biography**

**Yinebeb Mezgebu** has completed his PhD in 2023 from National University of Singapore, School of Medicine. He is currently senior lecturer and researcher in Bahir Dar University College of Medicine and Health Sciences, Ethiopia. He has published more than 10 papers in reputed journals.