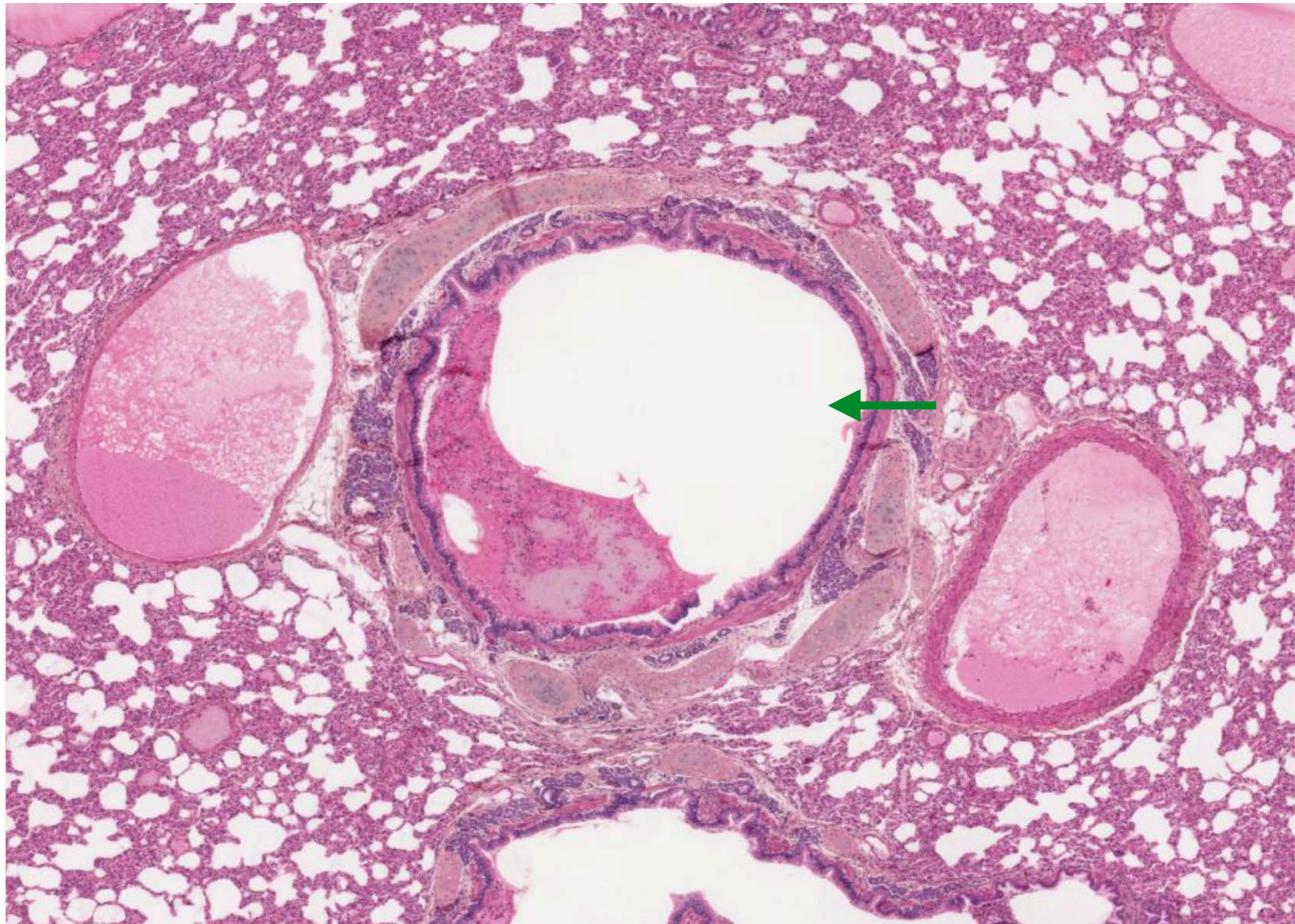


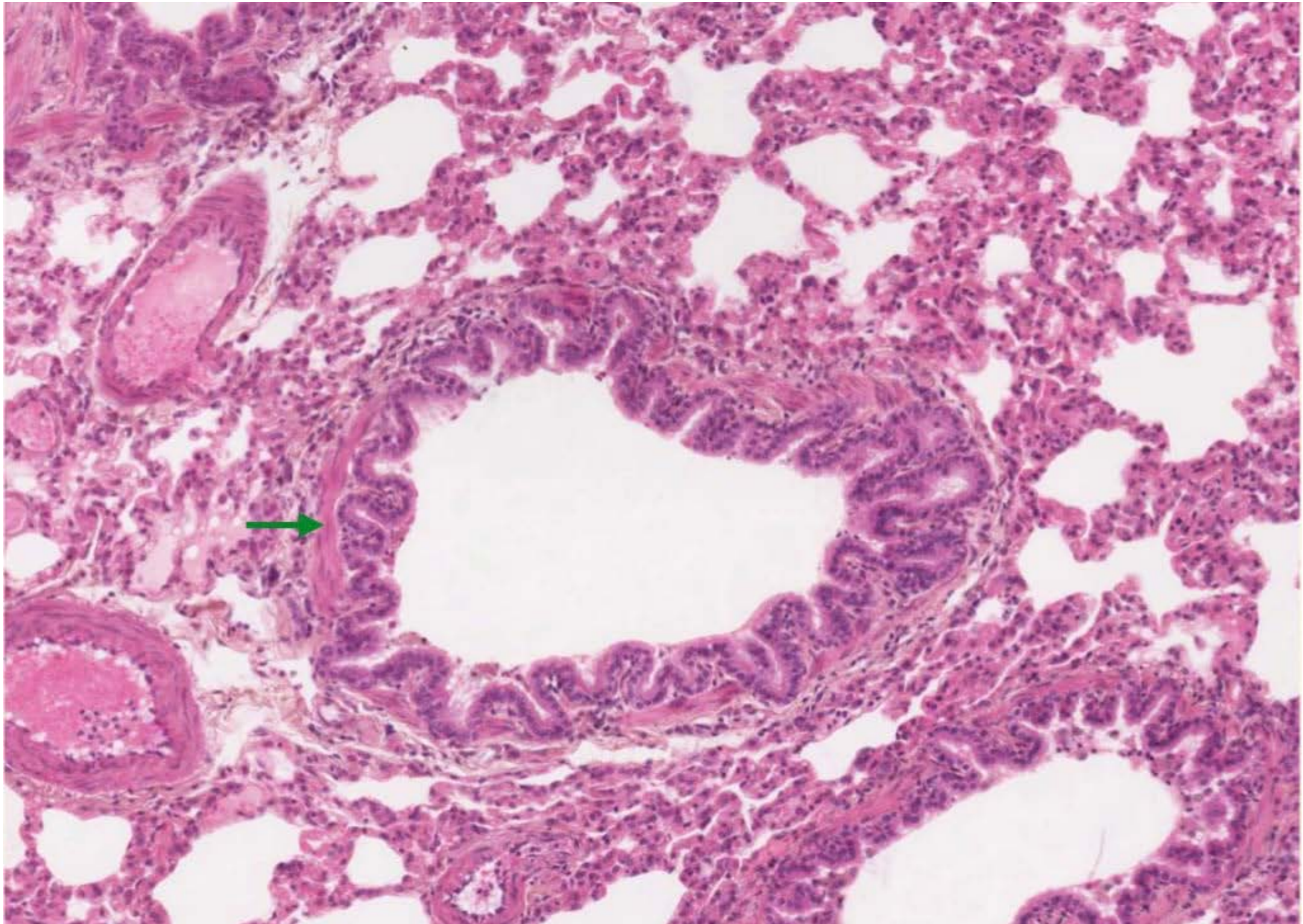
1. Which activity is associated with this segment of the respiratory tract (arrow)?

- Mucous production
- Gas exchange
- Surfactant production
- Deliver deoxygenated blood



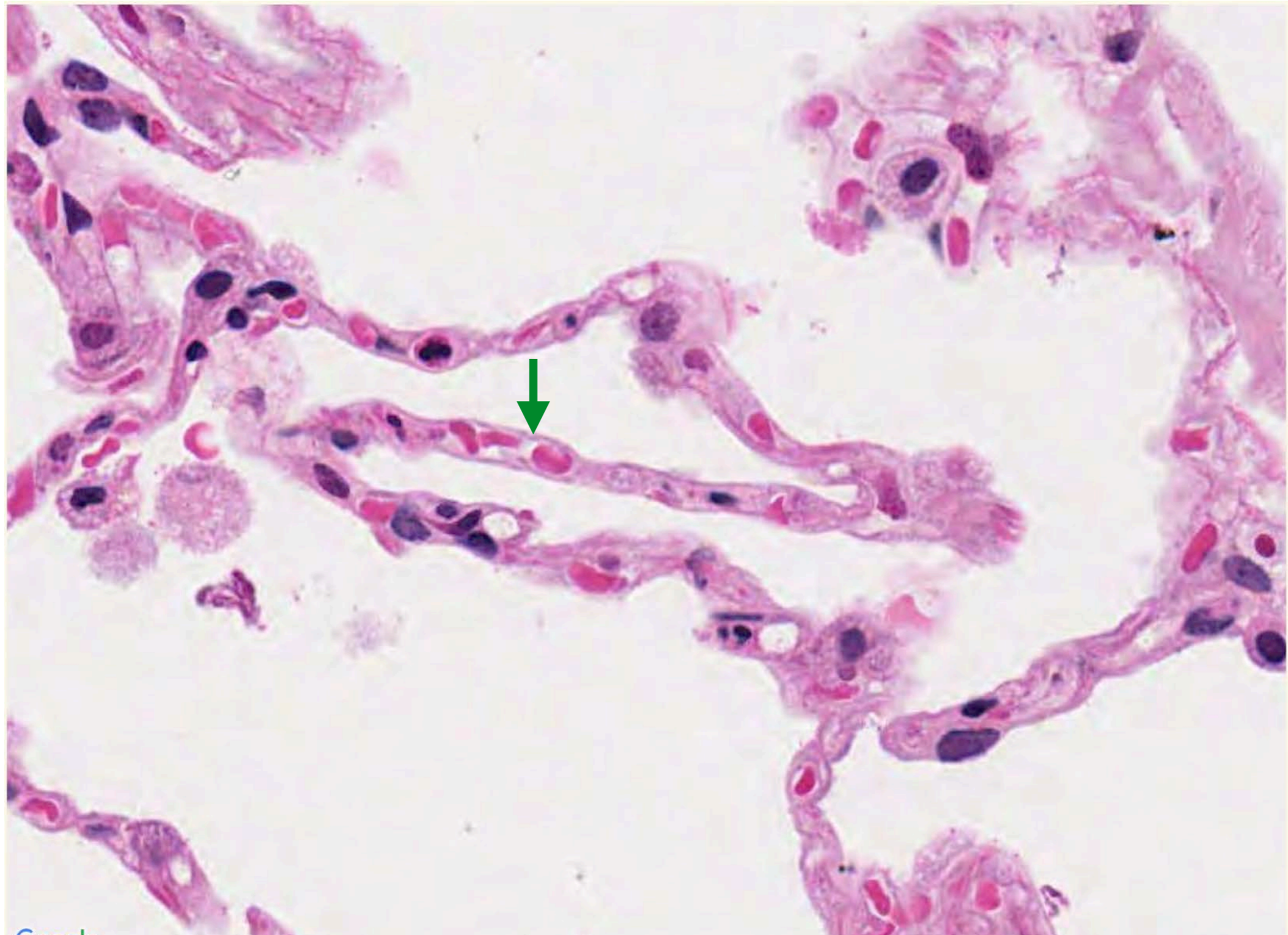
2. How would hypertrophy or hyperplasia of this tissue affect the function of the lung?

- Increase clearance of foreign particles
- Decrease rate of gas exchange
- Increase airway resistance
- Decrease airway resistance



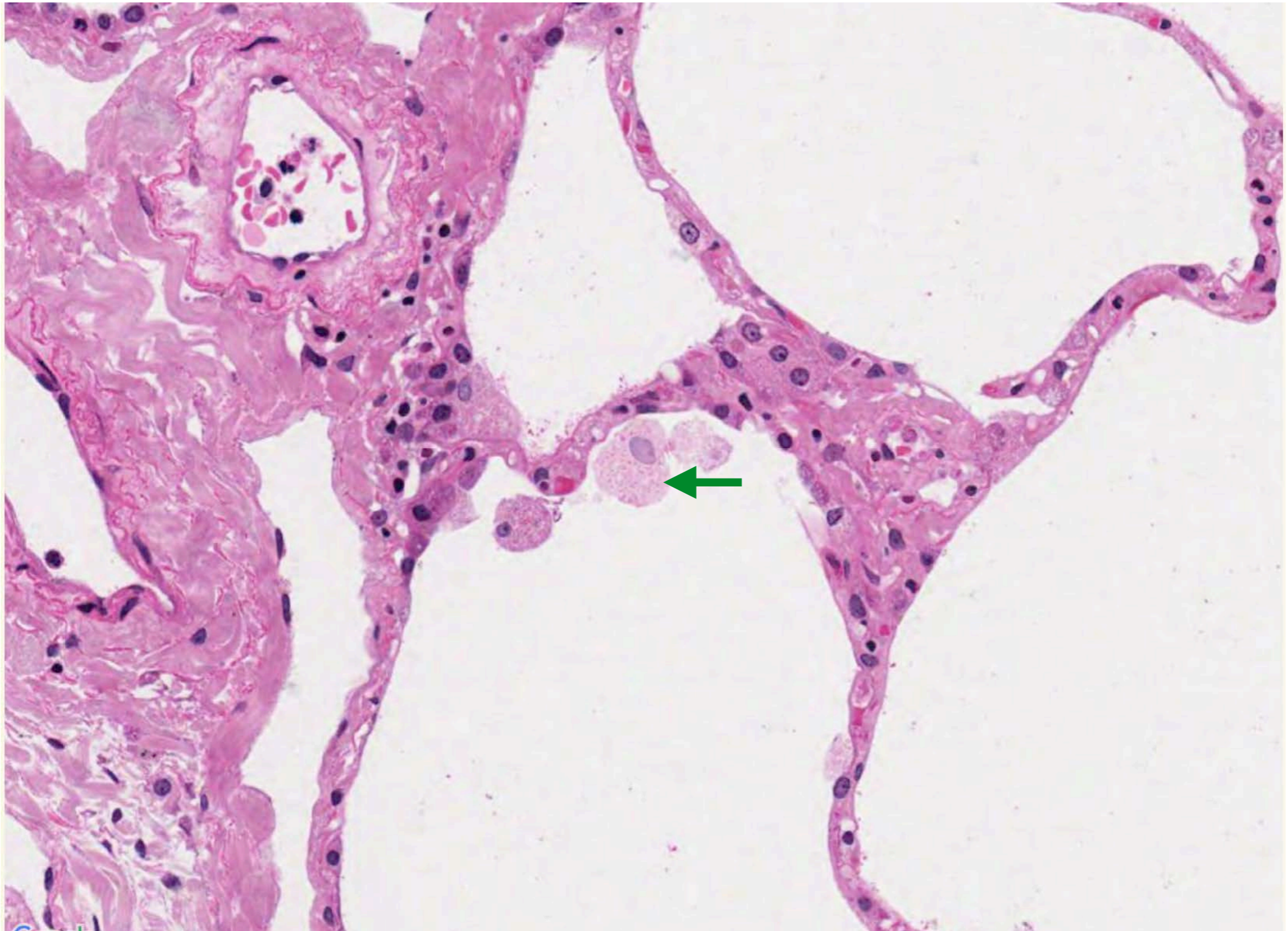
3. How would a thickening of this region affect the performance of the lung?

- Increase pulmonary blood pressure
- Increase compliance
- Decrease rate of gas exchange
- Decrease fluid absorption



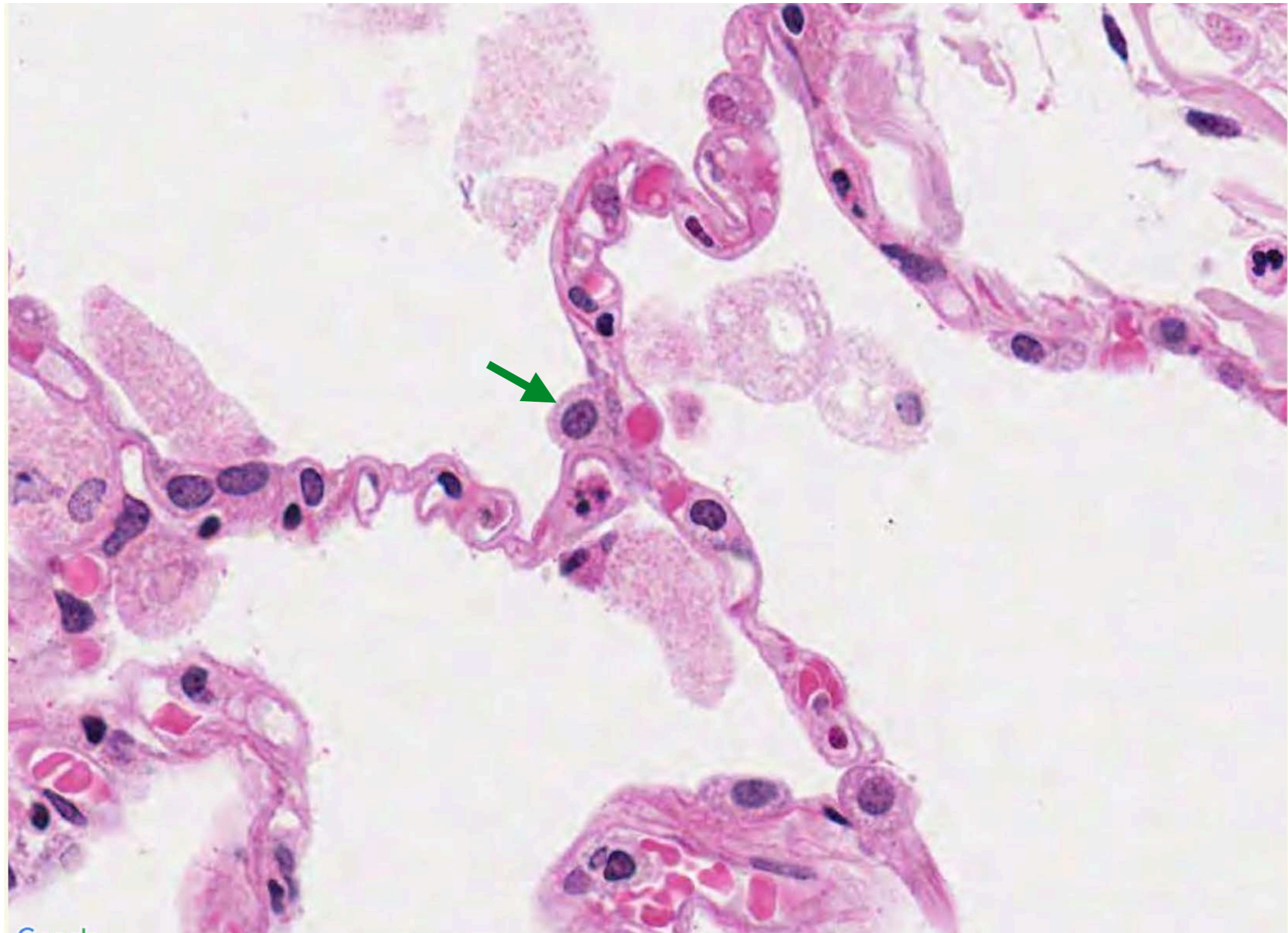
4. What is the primary function of this cell?

- Produce surfactant
- Engulf large particulate matter
- Form part of air-blood barrier
- Synthesize collagen



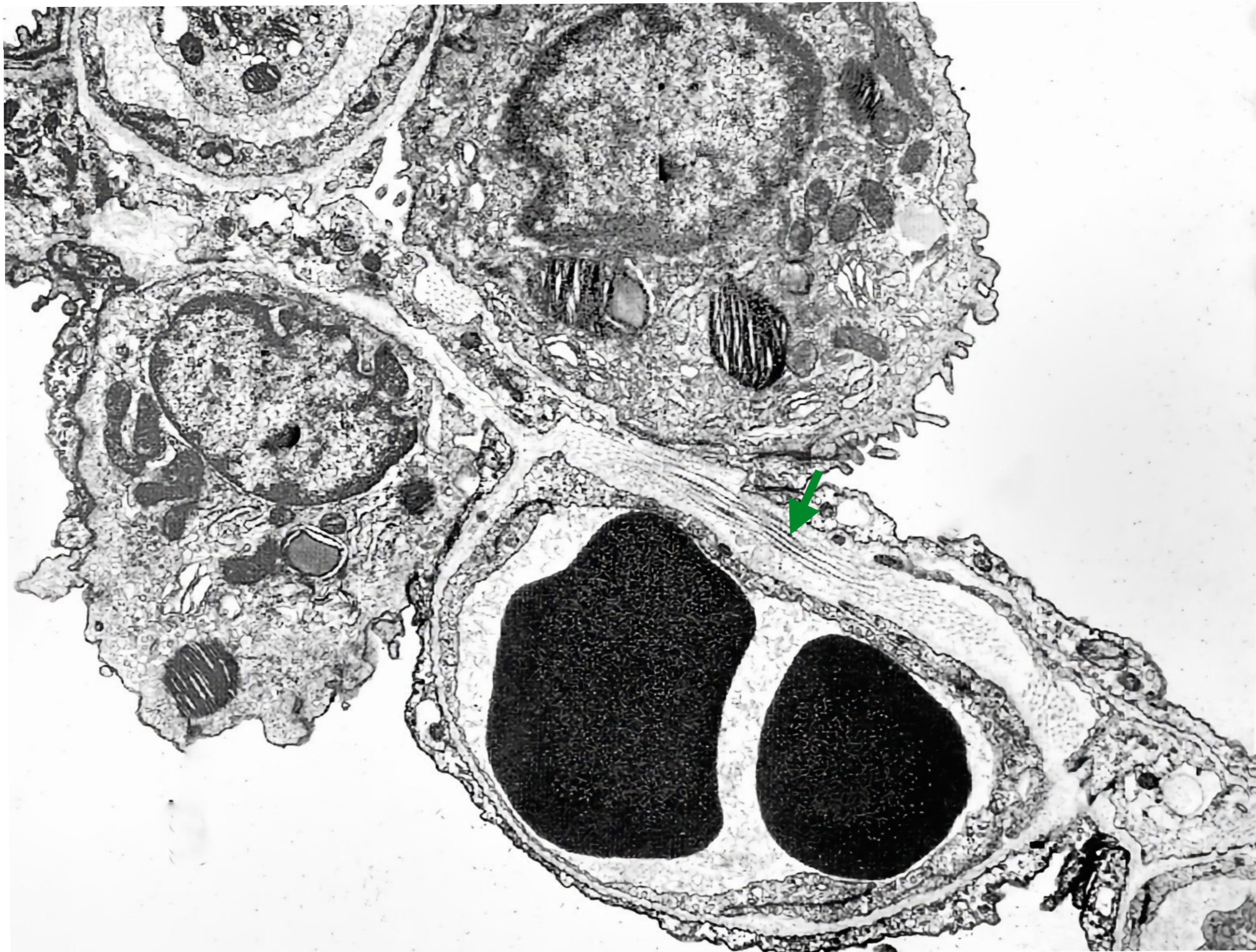
5. Which alveolar property would be **least** impacted by a loss of this type of cell?

- Gas exchange
- Clearance of foreign particles
- Alveolar tension
- Repair of tissue damage



6. Which change would result from an increase in this material?

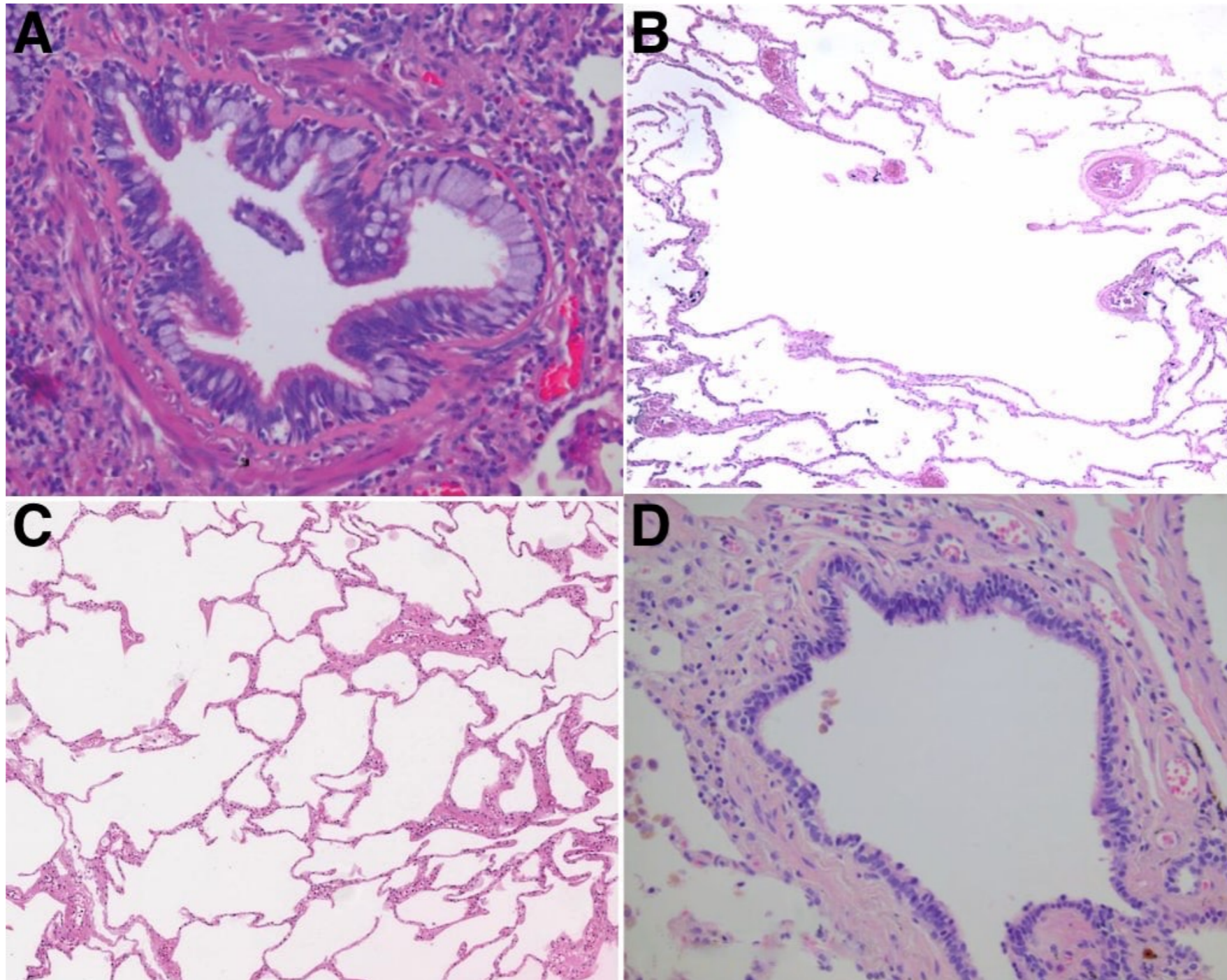
- Increase in the rate of gas exchange
- Decrease in rate of airflow
- Decrease in lung compliance
- Increase in alveolar fluid



A 62-year-old patient visits your office complaining of shortness of breath during light to moderate activity. The patient recently started an exercise program but has had trouble participating due to difficulty breathing while exercising.

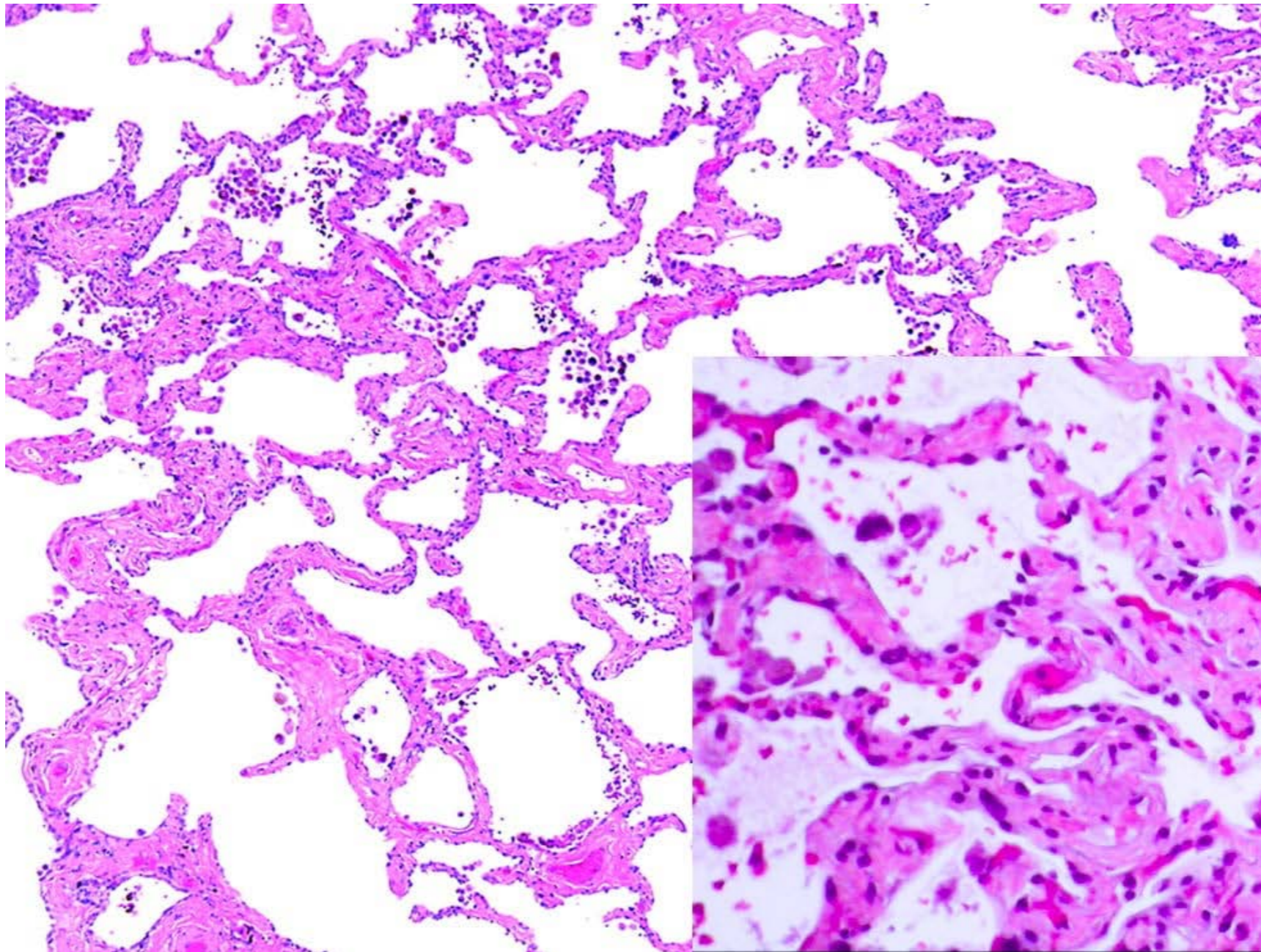
The results from a spirometry test show a FEV₁/FVC (forced expiratory volume in 1 sec / forced vital capacity) of 0.4 (normal is around 0.8). Blood O₂ levels are normal.

Which of the images matches the patient's symptoms? Changing which structural property in the lung might increase FEV₁/FVC in the patient? (Hint: the best option may be in a different segment of the respiratory tract.)



A 65-year-old patient presents with dyspnea. The patient recently retired from a long career with Cal Fire. Their spirometry tests show a FEV1/FVC of 0.9 but total forced vital capacity is below normal. A biopsy of the alveolar space reveals the images below. The inset is at higher magnification.

1. What structural and cellular changes do you observe?
2. How do those changes affect airway compliance?
3. How do the structural changes reduce FVC?
4. How would the structural changes affect the diffusion capacity of the patient's lung?



A 62-year-old patient visits your office complaining of shortness of breath during light to moderate activity. The patient recently started an exercise program but has had trouble participating due to difficulty breathing while exercising.

The results from a spirometry test show a FEV₁/FVC (forced expiratory volume in 1 sec / forced vital capacity) of 0.4 (normal is around 0.8). Blood O₂ levels are normal.

Which lung biopsy shown below best matches the patient's symptoms?

