Preclinical models for pulmonary disease and drug delivery
**Advantages of sheep as a model for respiratory research**

- similar to humans with respect to lung size, anatomy and development
- ability to perform repeated measures of lung mechanics/biological sampling comparable to humans
- responsive to human bronchospastic agents, antagonists and drug treatments

**Comparison of sheep and mouse models to humans**

<table>
<thead>
<tr>
<th></th>
<th>Human</th>
<th>Sheep</th>
<th>Mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-2 biased immune responses</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Allergen induced airway constriction</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Airway hyperresponsiveness</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Comparative physiology</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Airway branching</td>
<td>✓</td>
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<tr>
<td>Sensory nerves</td>
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**Features of the Allergenix models**

**Airway inflammation (acute and chronic models)**

- airway delivery of allergens or inflammatory mediators into the entire lung or defined segments for comparative evaluation of airway inflammation
- immune cell recruitment, activation and cytokine release

**Airway remodeling (chronic asthma model)**

- repeated allergen challenge in sensitized animals delivers key indicators of airway tissue remodeling
- increases in airway smooth muscle, collagen deposition, mast cells and epithelial/goblet cell hyperplasia
- association of airway remodeling with decline in lung function

**Key capabilities**

- *In vivo* sheep models of inflammation and allergic asthma
- pulmonary immunology
- histopathology
- respiratory physiology
- assessment of new drug delivery technologies

**Unchallenged control vs. HDM challenged**

- Smooth muscle
- Collagen (blue)

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**Preclinical models for pulmonary disease and drug delivery**

Allergenix provides *in vivo* efficacy studies for the validation of new drug targets and evaluation of drug delivery technologies;

- custom study design and data interpretation by a team of highly experienced scientists
- capability to develop new models to fulfill unmet needs

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