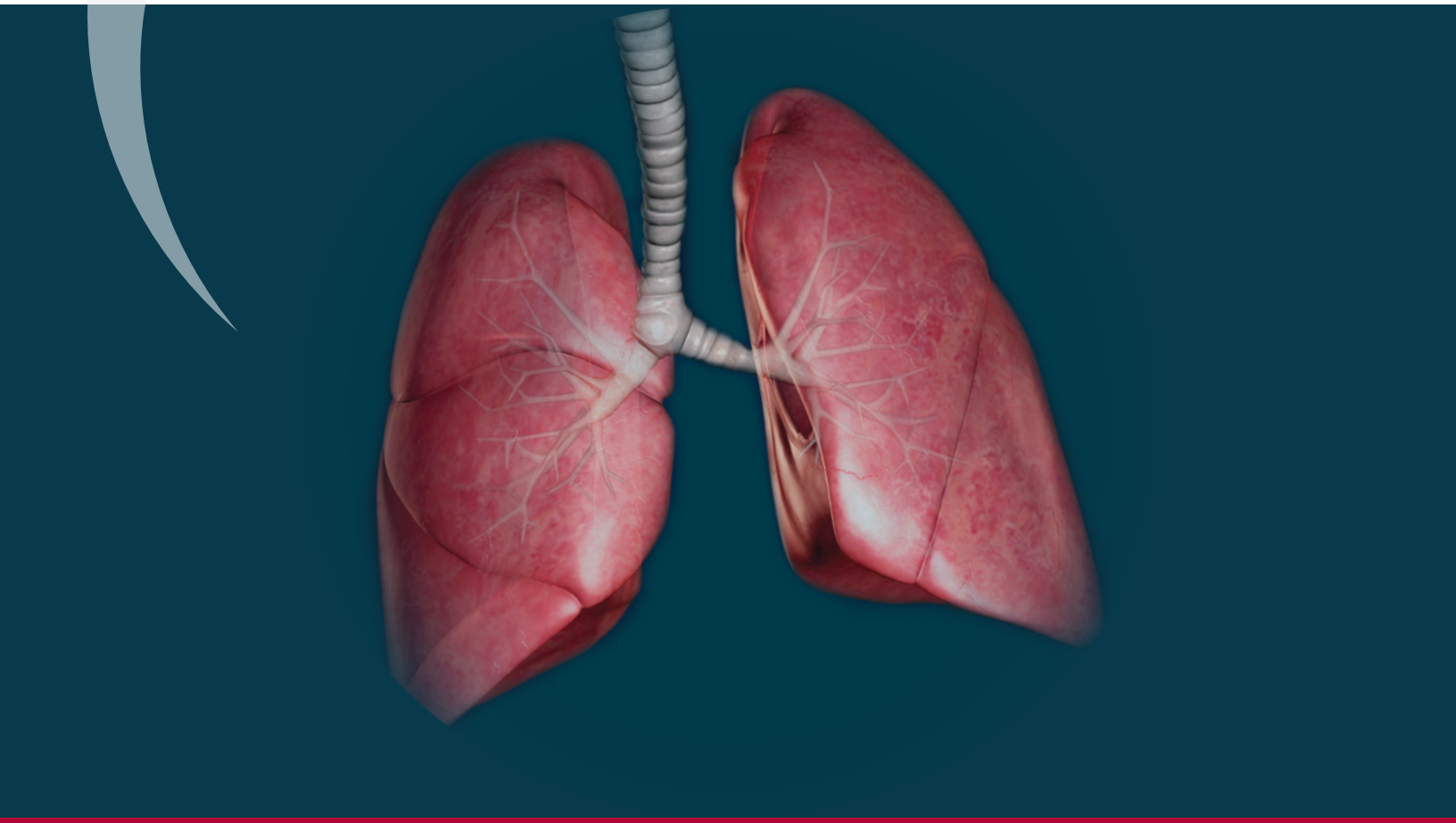
Buxco®

Respiratory Solutions



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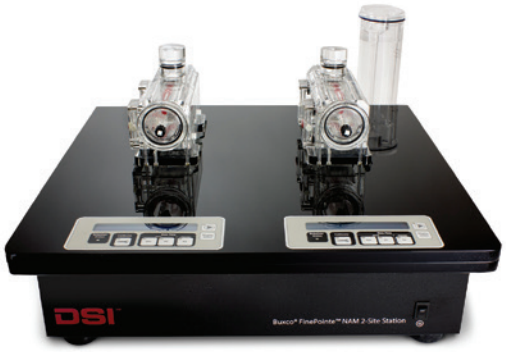
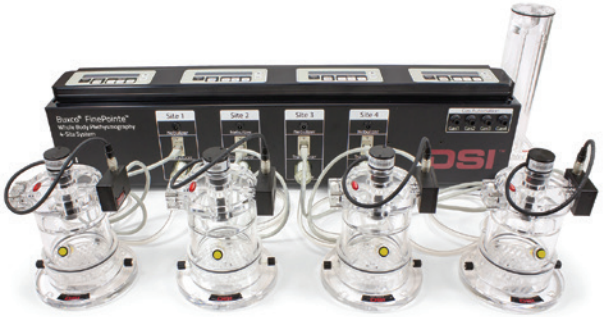
Elevate your research with proven technology.

DSI has the tools you need for your respiratory research. All Buxco® respiratory products are compatible with the powerful, easy-to-use, FinePointe software for collecting, analyzing, and reporting data.



Non-invasive airway mechanics



Whole body plethysmography

Acute Respiratory Disorders

Disorders of the respiratory system can be grouped into different categories. Example categories include obstructive versus restrictive, or acute versus chronic. Many disorders have similar causes, symptoms, and effects. As such, animal models (and hardware solutions) are often used to study more than one particular disease at a time.

Respiratory Disorders

- Respiratory depression
- Respiratory syncytial virus (RSV)
- Acute respiratory distress syndrome (ARDS)
- Mucociliary clearance and dysfunction
- Pneumonia
- Cough
- Tuberculosis (TB)
- Bronchiolitis
- Bronchitis

Applicable Hardware

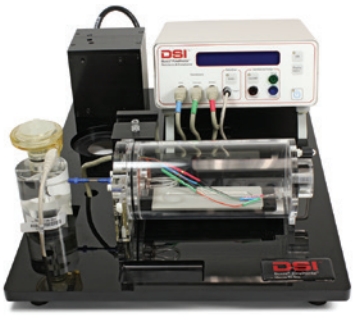
- Head out plethysmography
- Whole body plethysmography
- Non-invasive airway mechanics (double chamber)
- Resistance and compliance
- Pulmonary function testing
- Inhalation/exposure systems

Asthma

Asthma affects 8% of the world's population, and there is no cure. There are several risk factors for developing asthma, such as inhaled substances and particles that provide allergic reactions or irritate the airways. Other factors include genetic predisposition, environmental allergens, and dietary factors. Rodents are the typical species used when studying asthma. Ovalbumin (OVA) derived from chicken egg is a frequently used allergen that induces a robust, allergic pulmonary inflammation in laboratory rodents. Airway Hyperresponsiveness (AHR) is assessed using a muscarinic receptor (Methacholine). Primary endpoints of interest include respiratory rate, peak flows, and resistance; all are contributors to determining levels of bronchoconstriction.

Applicable Hardware

- Resistance and compliance
- Whole body plethysmography
- Non-invasive airway mechanics
- Pulmonary function testing



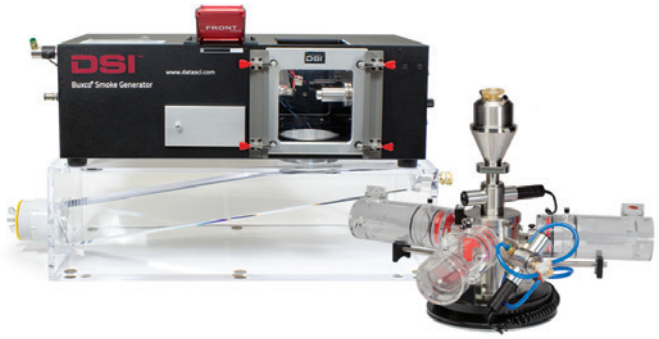
Resistance and compliance

COPD

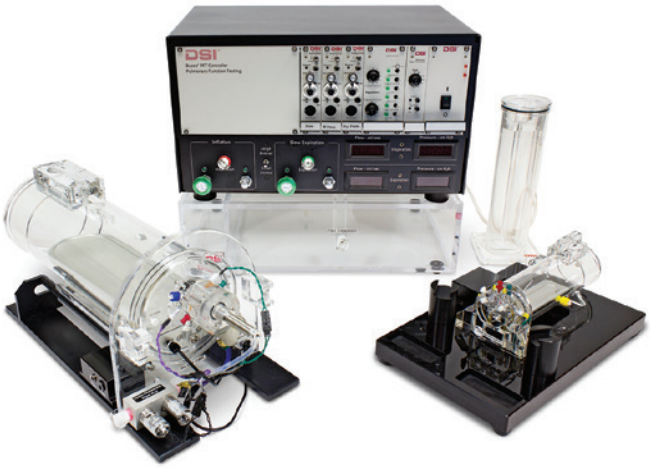
COPD (chronic obstructive pulmonary disease) is a progressive disease that makes it hard to breathe. The primary contributor to COPD is cigarette smoke. COPD is the third leading cause of death in the U.S., and there is no cure. The two primary conditions are emphysema and chronic bronchitis. Rodents are the typical species used when studying COPD. Recent publications suggest that cigarette smoke exposure to animals, using a smoke generating device, is the best approximation to human COPD. Other approaches include long-term lipopolysaccharide (LPS) exposure and the use of genetically modified models. Primary endpoints of interest include static and dynamic compliance and lung volumes.

Applicable Hardware

- Smoke generator
- Resistance and compliance
- Pulmonary function testing



Smoke generator and inhalation tower



Pulmonary function test

Applicable Hardware

- Resistance and compliance
- Pulmonary function testing

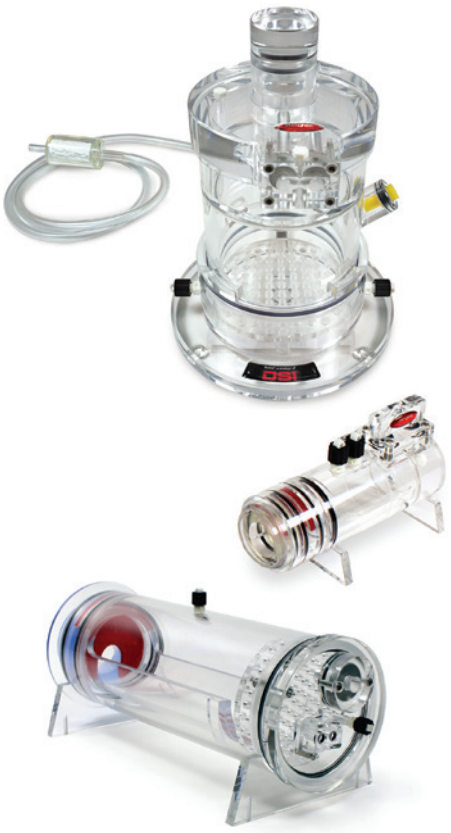
Lung Fibrosis

Pulmonary Fibrosis (PF): a disease which affects over 5 million people worldwide, and there is no cure. Mice are the most common species used when studying; however, several animal models of lung fibrosis exist, ranging from mice to primates.

Bleomycin is a commonly used chemotherapeutic agent that causes an acute lung injury response, followed by lung fibrosis. Other approaches include asbestosis and instillation of silica.

Cystic Fibrosis (CF): an incurable and inherited disorder affecting multiple organ systems, including the lungs. Animal models used to study CF typically focus on the use of mice with absent or mutant forms of the CFTR protein. Species including ferrets and pigs are also considered.

Pulmonary fibrosis and cystic fibrosis are two very different diseases. As such, the disease model studied often dictates the endpoints of interest. Although compliance and resistance are two commonly collected parameters, many supplemental endpoints can be calculated at the same time.



Plethysmographs

Safety Assessment

Lung function endpoints are commonly obtained when conducting disease-related pharmacology studies (fibrosis, asthma, etc.). However, similar endpoints are desired in safety pharmacology and toxicology groups as well. Safety pharmacology and toxicology studies have to be performed in compliance with the GLP Principles. The ICH guideline S7A requires safety pharmacology tests including measurements of pulmonary function. Respiratory toxicology studies are performed on pharmaceuticals or chemicals when inhalation is the primary route of exposure or when the airways are the focus of interest.

Most studies are performed in rodents; rats are the primary choice. When warranted, other species are considered. Although respiratory rate and tidal volume are the typical endpoints desired, many additional derived parameters and supplemental pulmonary function measurements are available.

Applicable Hardware

- Whole body plethysmography
- Head out plethysmography
- Resistance and compliance
- Non-invasive airway mechanics

DSI's Scientific Services: Data, Surgery, Technical, and Validation

Streamline your research by leveraging expertise you can rely on. Our Scientific Services teams can assist you with making better informed decisions, achieving greater surgical success, summarizing study data, executing preclinical in vivo studies, and meeting GLP validation requirements.

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