

## Biological effects of inhaled crude oil vapor. III Pulmonary effects

### Data dictionary

Field name	Field contents
Hazard identification	Process to determine if an agent is toxic
Crude oil vapor	(COV) Vapor generated from Deepwater Horizon surrogate oil
Ventilatory function	Properties of the lung associated with the process of breathing
Non-ventilatory function	Properties and functions of the lung not related to the process of breathing
Acute exposure	A one-time administration of an agent, eg, crude oil vapor
Sub-chronic exposures	Repeated exposures to an agent over a period of time
Day	Refers to a post-exposure day
Air	Filtered air used as a control
Airway resistance	( $R_L$ ) Describes the ease with which air is moved in and out of the lung, determined by the diameter of airways
Dynamic compliance	( $C_{dyn}$ ) Describes the ease with which the lung can be expanded
Resistance	( $R_{rs}$ ) Similar to $R_L$ of the airways
Elastance	( $E_{rs}$ ) elastic stiffness of the respiratory system
Tissue damping	( $G$ ) parameter of the constant phase model closely related to tissue resistance and reflects the energy dissipation in the alveoli
Tissues elastance	( $H$ ) Parameter of the constant phase model related to tissue and reflects the energy conservation in the alveoli
Newtonian resistance	( $R_n$ ) Parameter of the constant phase model which represents the resistance of the central of conducting ways
Hysteresivity	( $G/H$ ) A dimensionless parameter that reflects the coupling of dissipative and elastic properties of the lung
Methacholine	(MCh) An agonist drug that stimulates airway smooth muscle to contract and cause bronchoconstriction. Causes an increase in airway resistance
Airway smooth muscle	The muscle surrounding airways that is contracted by methacholine
EL	Abbreviation for extraluminal bath of the isolated, perfused trachea preparation
IL	Abbreviation for intraluminal bath of the isolated, perfused trachea preparation
PBS	Phosphate buffered saline
Airway epithelium	A tissue containing several types of cells that lines the airways and has a barrier function. It also is responsible for hydration of the airways and clearance of agents from the lungs
Reactivity	A term used to describe how sensitive a tissue or organ responds to a provocative agent that causes a response
Efferent nerve	Refers to nerves that leave the spinal cord and innervate tissues to stimulate them to respond after the release of a transmitter mediator
Cholinergic	Refers to a type of efferent nerve in the airway that releases acetylcholine, a transmitter, and causes smooth muscle contraction and epithelium stimulation

Ion transport	The process by which cells move ions across a membrane or epithelium
Vascular permeability	The tendency for fluid to move from the blood compartment into tissues outside blood vessels
KCl	Potassium chloride, used to contract smooth muscle
Evans blue dye	A dye that binds to blood protein that enters tissues if vascular permeability is increased
Frequency	Pulses per second or Hz
Ussing chamber	Apparatus used to measure airway epithelial ion transport
Ouabain	Inhibitor of the Na <sup>+</sup> ,K <sup>+</sup> -pump
Amiloride	Inhibitor of Na <sup>+</sup> channels
Bumetanide	Inhibitor of the Na <sup>+</sup> ,K <sup>+</sup> ,Cl <sup>-</sup> -cotransporter
PD	Potential difference across airway epithelium
ID	Assigned identification number to experimental subject
Exposure	Type of exposure of animal, either filtered air or COV
Time (d)	Post-exposure time in days (d) after the end of exposure to air or COV
-log[MCh (M)]	Negative log <sub>10</sub> of the molar MCh concentration
EL Response	Contractile response in (cm H <sub>2</sub> O) to MCh following administration to the EL bath of the isolated, perfused trachea preparation
IL Response	Contractile response to MCh in (cm H <sub>2</sub> O) following administration to the IL bath of the isolated, perfused trachea preparation
[MCh] (µg/ml)	MCh concentration or aerosol delivered by inhalation
R <sub>L</sub> (cm H <sub>2</sub> O×sec/ml)	Airway resistance and its units
C <sub>dyn</sub> (ml/cm H <sub>2</sub> O)	Dynamic compliance and its units
Electric field stimulation	(EFS) Method for electrically stimulating nerves in the airway wall using tracheal strips
Stimulus frequency (Hz)	Frequency of EFS in Hertz
Response (g)	Contractile responses of tracheal strips in grams
Tissue	In Evans Blue dye experiments, either trachea, bronchi or lung
[Evans Blue (µg/g tissue)]	Concentration of Evans Blue dye in tissues after extravasation
Agent	Pharmacological inhibitor, either amiloride, bumetanide or ouabain
I <sub>sc</sub> (µA/cm <sup>2</sup> )	Short circuit electrical current across epithelium due to electrogenic ion transport, and its units
R <sub>t</sub> (Ohms/cm <sup>2</sup> )	Electrical resistance to ion flow across the epithelium through tight junctions, and its units
R <sub>rs</sub> (cm H <sub>2</sub> O/ml)	Resistance and its units
E <sub>rs</sub> (cm H <sub>2</sub> O/ml)	Elastance and its units
R <sub>n</sub> (cm H <sub>2</sub> O×sec/ml)	Newtonian resistance and its units
G (cm H <sub>2</sub> O/ml)	Tissue damping and its units
H (cm H <sub>2</sub> O/ml)	Tissue elastance and its units
Eta (G/H)	Hysteresivity (unitless)