

Representative cellular models mimicking human lung biological response and understanding reactive geochemical properties of mixed coal dusts are key factors for identifying potential hazards associated with coal mining and other dust-producing industries.

Identifying the inhalation hazards from mixed coal mine dusts

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- A range of coal mine dust lung diseases stem from a range of components present, including **reduced iron minerals** (e.g. pyrite), **crystalline silica** (quartz), **silicates** (clays) and **aliphatic and aromatic carbon** compounds.
- Understanding which of these components contributes towards disease initiation is critical for implementing safety controls for mine workers.

Representative cellular models to assess hazards

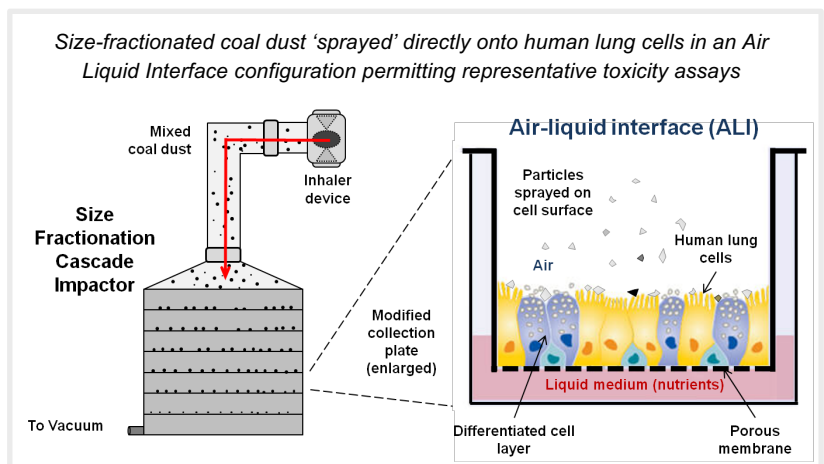
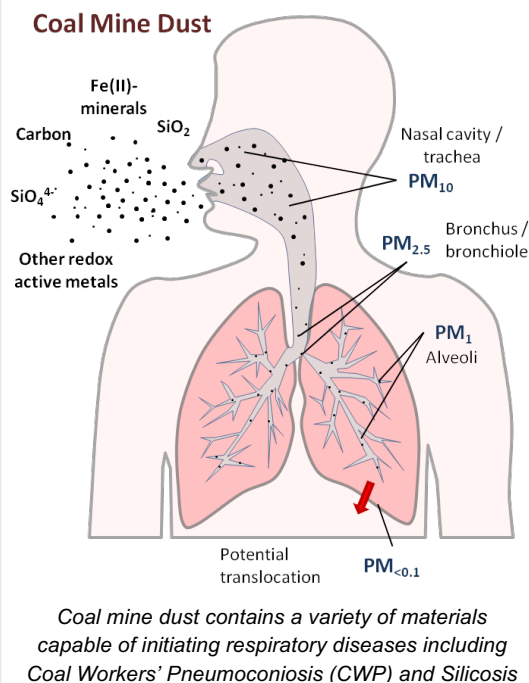
- Size-fractionated mixed mine dusts directly deposited on representative human lung cell models in an air-liquid-interface (see schematic below)
- Range of representative lung cell models / types available for use, including; human bronchial cells capable of differentiation, immune-response cells (macrophages) and human epithelial cells
- Advanced imaging and analytical techniques for identifying components of most concern

Advanced characterisation of mixed dusts

- Size-based analyses of geochemical components
- Synchrotron-based techniques for identifying reactive mineralogy (e.g. X-ray absorption spectroscopy, X-ray fluorescence microprobe)

Applications

- Coal industry monitoring
- Other mining industries
- Construction / tunnelling



More information

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