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| **Lunar Dust Induces Minimal Pulmonary Toxicity Compared to Earth Dust** |
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| **Introduction/Aim:**  Humans are returning to the moon for the first time in over 50 years. Apollo mission reports indicate that lunar dust poses great inhalation toxicity risks. Previous generations of lunar dust simulant exposure in vivo resulted in tissue and cellular damage in the lung and pulmonary inflammation. However, there is limited study on the toxicity of lunar dust simulants LMS-1 and LHS-1, and it’s toxicity on the epithelial cells of the lung. Currently, there is no comparison between the effects of Earth dust or air pollution exposure which is known to have adverse health effects, and dust exposure on the moon. This study aims to compare the toxic effects of lunar dust simulants and Earth dust on bronchial and alveolar epithelial cells.  **Methods:**  LMS-1 and LHS-1 were ground with a pestle and mortar and filtered through grade 5 Whatman filter paper to isolate particles ≤2.5µm. BEAS-2B and A549 cells were treated with ≤2.5µm sized LMS-1, LHS-1, and Earth dust (10µg/ml, 50µg/ml, and 100µg/ml) for 48 and 72 hours. ELISA was used to measure IL-8 and IL-6 release and trypan blue exclusion test was conducted as a measurement of cell viability.  **Results:**  Earth dust was significantly more potent in inducing IL-8 and IL-6 release by BEAS-2B cells. Compared to lunar dust simulants, Earth dust significantly reduced the cell viability of BEAS-2B cells indicative of increased toxicity. A549 cells exhibited similar responses to the lunar dust simulants and Earth dust, suggesting relatively equal toxicities. n=4, P < 0.05.  **Conclusion:**  LMS-1 and LHS-1 induced time and concentration dependent pro-inflammatory cytokine release and decreased the cell viability of BEAS-2B and A549 cells. However, Earth dust was found to be more toxic than lunar dust simulants suggesting that the lunar dust simulants of the mare and highland regions of the moon is not a highly toxic dust, but rather a physical irritant. |
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