The Effects of Whole Life, Low Dose Cadmium Exposure on Mouse Lung Histology and DNA Damage

Roman V. Isakov1, Tayler J. Croom-Perez2, Jamie L. Young1, Hannah D. Jaggars1, Lu Cai1, Gary W. Hoyle1, John Pierce Wise, Sr.1

1) Department of Pharmacology and Toxicology, University of Louisville, Louisville, Kentucky USA; 2) Department of Pediatrics, University of Louisville, Louisville, Kentucky, USA; 3) Department of Environmental and Occupational Health Sciences, University of Louisville, Louisville, KY, USA

A One Environmental Health Approach

Lung cancer is the leading cause of cancer deaths amongst the population. Cigarette smoking is considered the major cause of lung cancer, but there are a number of other factors that account for this disease such as environmental exposure through metals, genetic, and occupational hazards. Cancer is a well known human health concern and associated with a number of health effects, including cancer. It is naturally occurring and widely used in industrial productions. For non-smokers, the main source of cadmium exposure is through diet. Other heavy metals, including hexavalent chromium and arsenic, are well known to induce lung cancer. Recently, accumulation data support an independent effect for cadmium in the lung of human lung cancer patients with occupational and non-occupational workers. One of the major events leading to heavy metal carcinogenesis is DNA damage. Therefore, this project aims: Does cadmium induce DNA damage within the lungs of whole life, low dose exposed mice?

Aim 1: Characterize Cadmium Induced Changes in Cellular Structure and Morphological Assessments

As an initial characterization of the overall effects of cadmium on the lung, we performed histological analysis of formalin fixed paraflin embedded lung sections and identified any histological changes that could lead to carcinogenic outcomes.

Aim 2: Effect of Cadmium Induced Tissue Remodeling and Repair

As a result, characterization of the local effects of cadmium on the lung, we performed histological analysis of formalin fixed paraflin embedded lung. This analysis will reveal any changes in the amount of collagen present, indicating progression towards inflammation or other disease states.

Aim 3: Measure Cadmium Induced DNA Damage

One of the major events leading to heavy metal carcinogenesis is DNA damage. To determine if cadmium exposure leads to DNA damage, protein levels of DNA damage marker H2AX were measured in lung tissue from mice exposed to cadmium.

Further Reading
