Acute Lung injury of mouse Caused by $PM_{2.5}$ Aerosols studied by Synchrotron Microradiograph

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Abstract

Six solutions contained $PM_{2.5}$ aerosol particles, $FeSO_4$, $ZnSO_4$ and their mixtures were used to be instilled into mouse lungs. By two days after instillation, the live mice were checked in vivo by synchrotron refractive-index microradiography at Pohang Light Source. In addition after extracted and examined by dissection, the right lobes of lung were fixed by formalin, then imaged by synchrotron microradiography again. Corresponding parts of those lung tissues were embedded in paraffin for histopathologic study. The synchrotron x-ray microradiographs of live mouse lung showed different lung structure after instilled different toxic solutions. Hemorrhage points and texture changes in lung were observed for the mice instilled by toxin solutions. The synchrotron x-ray microradiographs and the histopathological study of fixed tissues showed consistent results. By compared with the conventional x-ray radiography of mouse lung the synchrotron x-ray microradiography showed much high resolution. It was found that the acute lung injury of mice caused by solution of $PM_{2.5}$+$FeSO_4$+$ZnSO_4$ was more serious than other toxin solutions and the composition of bioavailable metals played a major role in the toxicity of aerosol particles The synchrotron refractive-index microradiography may be further developed to observe the pneumonia, lung cancer and other disease at early stage in future.

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