Epidemiological studies have shown an association between ambient particle inhalation and adverse respiratory health effects. Inhalation of ultrafine particles (UFP, diameter < 100 nm) has been suggested to contribute to exacerbation of allergic airway inflammation. Here we analyze the potential effects of allergen sensitization and challenge on total and regional deposition of UFP in the lung. Ovalbumin (OVA)-sensitized and nonsensitized mice were exposed for 1 h to ultrafine iridium particles radiolabeled with (192)Ir (UF-Ir) (0.2 mg m(-3)) at 2 different time points either before or after allergen (OVA) challenge. Additional sensitized and nonsensitized mice were exposed to UF-Ir without allergen challenge. Lung total and regional UF-Ir deposition were calculated according to the distribution of radioactivity in the body and in the excreta during 3 days following UF-Ir inhalation. OVA-sensitized mice showed a 21% relative increase of total UF-Ir deposited fraction compared to nonsensitized mice. When UF-Ir inhalation was performed after allergen challenge, no difference in total UF-Ir deposited fraction between sensitized and nonsensitized mice was detectable. Furthermore, no differences in extrathoracic deposition or in regional particle deposition were detected between all experimental groups. This study indicates that allergen sensitization alone can affect UFP deposition in the lungs. Whether
higher UFP deposition in sensitized individuals compared to nonsensitized individuals or whether other factors, like alterations in long-term clearance kinetics, contribute substantially to the susceptibility of allergic individuals to particle exposure has yet to be elucidated.