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TITLE: EFFECTS OF SUBCHRONIC INHALATION EXPOSURE TO CARBON BLACK NANOPARTICLES IN THE NASAL AIRWAYS OF LABORATORY RATS

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ABSTRACT: The nose can be an efficient filter for inhaled gases, vapours and particles that may be harmful to the lung. Nasal airways may also be targets for injury caused by inhaled toxicants. To investigate the nasal toxicity of carbon black nanoparticles (CB), rats were exposed to 0, 1, 7 or 50 mg/m³ of high surface area CB (HSCB; primary particle size 17 nm; particle surface area 300 m²/g) for 6 h/day, 5 days/week for 13 week. Additional rats were exposed to 50 mg/m³ of low surface area CB (LSCB; primary particle size 70 nm; particle surface area 37 m²/g). Rats were sacrificed 1 day, 13 week, or 11 months postexposure (PE). Rats exposed to mid- or high-dose HSCB had nasal inflammatory and epithelial lesions at one day PE. HSCB-induced nasal inflammation resolved by 13 week PE, but some nasal epithelial lesions were still present in rats at 11 months after high-dose HSCB exposure. Low-dose HSCB or high-dose LSCB induced only minimal epithelial lesions that were resolved by 13 week PE. Results indicate that incidence, severity, and persistence of CB-induced nasal toxicity in rats is dependent on exposure concentration, particle surface area, and time PE. Effects of inhaled CB on human nasal airways are yet to be determined.