

TABLE VI-8.—STUDIES ON TOXICOLOGICAL EFFECTS OF DPM EXPOSURE, 2000–2002—Continued

Authors, Year	Description	Key results	Agent(s) of toxicity
Whitekus <i>et al.</i> , 2002	In Vitro: assessment of ability of six antioxidants to interfere in DPM-mediated oxidative stress, cell cultures used. In Vivo: assessment of sensitization to OA and/or DPM and possible modulation by thiol antioxidants, mouse inhalation model used.	Thio antioxidants (given as a pre-treatment) inhibit adjuvant effects of DPM in the induction of OA sensitization.	DE generated from light-duty diesel engine, DPM collected, dissolved in saline, and aerosolized.

*Key:

- (A) immunological and/or allergic reactions.
- (B) inflammation.
- (C) mutagenicity/DNA adduct formation.
- (D) Induction of free oxygen radicals.
- (E) airflow obstruction.
- (F) impaired clearance.
- (G) reduced defense mechanisms.
- (H) adverse cardiovascular effects.

TABLE VI-9.—REVIEW ARTICLES ON TOXICOLOGICAL EFFECTS OF DPM EXPOSURE, 2000–2002

Authors, Year	Description	Conclusions	Agent(s) of toxicity
ILSI Risk Science Institute Workshop Participants, 2000.	Review of rat inhalation studies on chronic exposures to DPM and to other poorly soluble nonfibrous particles of low acute toxicity that are not directly genotoxic.	No overload of rat lungs at lower lung doses of DPM and no lung cancer hazard anticipated at lower doses.	Poorly soluble particles, nonfibrous particles of low acute toxicity and not directly genotoxic (PSPs)
Nikula, 2000	Review of animal inhalation studies on chronic exposures to DE, carbon black, titanium dioxide, talc and coal dust.	Species differences in pulmonary retention patterns and lung tissue responses following chronic exposure to DE.	DE, carbon black, titanium dioxide, talc and coal dust
Oberdoerster, 2002	In Vivo: review of toxicokinetics and effects of fibrous and nonfibrous particles.	High-dose rat lung tumors produced by poorly soluble particles of low cytotoxicity (e.g., DPM) not appropriate for low-dose extrapolation (to humans); lung overload occurs in rodents at high doses.	Fibrous particles, and nonfibrous particles that are poorly soluble and have low cytotoxicity (PSP)
Veronesi and Oortgiesen, 2001	In Vitro: review of nasal and pulmonary innervation (receptors) and pulmonary responses to PM, mainly BEAS cells and sensory neurons used.	Pulmonary receptors stimulated/activated by PM, leading to inflammatory responses.	PM: residual oil fly ash, woodstove emissions, volcanic dust, urban ambient particulates, coal fly ash, and oil fly ash.

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VII. Feasibility

A. Background on Feasibility

Section 101(a)(6)(A) of the Federal Mine Safety and Health Act of 1977 (Mine Act) requires the Secretary of Labor to establish health standards which most adequately assure, on the basis of the best available evidence, that no miner will suffer material impairment of health or functional capacity over his or her working lifetime. Such standards must be based upon:

Research, demonstrations, experiments, and such other information as may be appropriate. In addition to the attainment of the highest degree of health and safety protection for the miner, other considerations shall be the latest available scientific data in the field, the feasibility of the standards, and experience gained under this or other health and safety laws. Whenever practicable, the mandatory health or safety standard promulgated shall be expressed in terms of objective criteria and of the performance desired. (Section 101(a)(6)(A)).

The legislative history of the Mine Act states:

This section further provides that “other considerations” in the setting of health standards are “the latest available scientific data in the field, the feasibility of the standards, and experience gained under this and other health and safety laws.” While feasibility of the standard may be taken into consideration with respect to engineering controls, this factor should have a substantially less significant role. Thus, the Secretary may appropriately consider the state of the engineering art in industry at the time the standard is promulgated. However, as the circuit courts of appeals have recognized, occupational safety and health statutes should be viewed as “technology-