

**Dry Trimellitic Anhydride (TMA) Powder Dermal Sensitization Induces Specific
IgE and Airway Responses Following Challenge in Brown Norway Rats**

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TMA is a low-molecular-weight chemical that can induce production of specific IgE and occupational asthma in sensitized individuals. The respiratory tract is considered to be the major exposure route leading to immunological sensitization, but dermal exposure also has the potential to induce TMA-sensitization. Our previous work demonstrated a dose-dependent production of specific IgE and airway response after TMA aerosol challenge in Brown Norway (BN) rats sensitized by overnight TMA (occluded) dermal exposure.

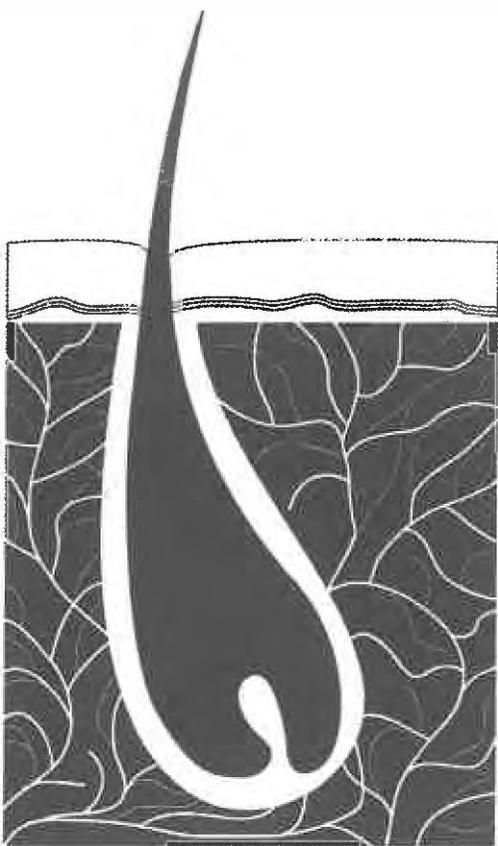
IgE production and airway responses to inhaled TMA after repeated, short-term (5 hr) dermal exposures to dry TMA powder without occlusion were investigated in two groups of rats (n=8/group, dose: 40 mg or 4 mg) in the present study. Dermal exposures were performed on days 0, 7, 14 and 21. Sera were collected on days 0, 7, 14, 21, 28, 35 and positive IgE was found after 14 days. Rats were challenged by a 10 min, 40 mg/m³ TMA (nose-only) aerosol and respiratory physiology monitored on day 35 immediately following exposure in unrestrained rats using a whole body plethysmography system.

Compared to non-sensitized rats, the two groups of sensitized BN rats displayed distinct early (EAR) and late airway responses (LAR), as noted by an increase in enhanced pause (Penh, an index of airway resistance). The EAR was noted immediately following the challenge and lasted approximately 0.5 to 1 hour. The LAR began 3 to 4 hours post-challenge durations ranging from 4 to 8 hours.

This work demonstrates that dermal exposure to TMA powder can lead to immunological sensitization and obstructive airway responses on subsequent exposure to TMA aerosol.

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