

## Occupational contact dermatitis from ethylenediamine in a wire-drawing lubricant

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## Case Report

A 45-year-old man presented with a 6-month history of work-related dermatitis of the hands and inner forearms. He was previously healthy and denied prior exposure to ethylenediamine-containing creams, aminophylline or tincture of Merthiolate. He worked as a galvanized-steel wire-drawer and was regularly exposed to Steelskin® 1550, a lubricant containing up to 1% ethylenediamine (EDA) (Table 1).

Patch testing was done with TRUE Test™, a machinists' series, and Steelskin® 1550 as is and 10% aq. At day (D) 4, there were positive reactions to Steelskin® 1550, EDA, triethylenetetramine (TETA), colophony, abietic acid and abitol (Table 2). He did not react to triethanolamine and was not tested to diethylenetriamine (DETA).

## Discussion

Allergic contact dermatitis from EDA is still common in Canada, due to the popularity of Kenacomb® cream (Tri-Adcortyl®, UK – Mycolog®, USA) among general physicians (1). Occupational sensitization is rare, even though EDA is present in numerous industrial processes. It is used as a solvent for casein, albumin, shellac and sulfur, a stabilizer in rubber latex and a textile lubricant (2). It is also found in epoxy resin hardeners, cooling oils and antifreeze solutions, the preparation of dyes, rubber accelerators, fungicides, synthetic waxes, fibers and resins, insecticides and asphalt-wetting agents (3). Occupational dermatitis has been reported from a floor polish remover, in which EDA was used to complex the zinc present in paint and floor polish (4).

Occupational dermatitis from EDA in cooling oils was recognized 20 years ago, and one such outbreak occurred in a firm producing a plated, high-tensile steel wire (5, 6). More recently, an epidemic of hand dermatitis was described in 27 wire-drawers exposed to a lubricant containing EDA (7). 11 of 18 patch-tested workers had positive reactions to EDA but none reacted to the oil itself. The lubricant complexed with zinc in the galvanized-steel wire to release free EDA. Our case differs because the patient reacted strongly to his own unused oil, down to a dilution of 10%, corresponding to a 0.1%

Table 1. Composition of Steelskin® 1550

|                          |        |
|--------------------------|--------|
| amine phosphate          | 10–30% |
| fatty acid amino salt    | 10–30% |
| ethoxylated fatty amines | 10–30% |
| compound phosphate ester | 5–10%  |
| ethylenediamine          | 0.1–1% |

Table 2. Patch test results at D4

| Substance            | %     | Vehicle | Result |
|----------------------|-------|---------|--------|
| Steelskin® 1550      | as is |         | +++    |
| Steelskin® 1550      | 10%   | aq.     | ++     |
| ethylenediamine*     | 1%    | pet.    | ++     |
| triethylenetetramine | 0.5%  | pet.    | +      |
| colophony*           | 20%   | pet.    | +      |
| abietic acid         | 10%   | pet.    | ++     |
| abitol               | 10%   | pet.    | +      |

\* Tested with TRUE Test™. % and vehicle expressed as equivalent of standard technique.

concentration of EDA. A recent report described an outbreak of sensitization to polyamines in a complex synthetic coolant used in offshore drilling (8). 5 workers became sensitized to diethylenetriamine (DETA) and triethylenetetramine (TETA), and showed cross-reactivity with EDA (Fig. 1), as previously demonstrated (9). Our patient was also positive to TETA, though we cannot be certain that Steelskin® 1550 did not contain TETA. Our patient's sensitization to colophony and its derivatives remains unexplained.

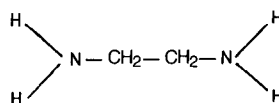
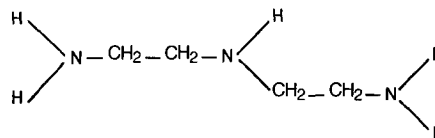
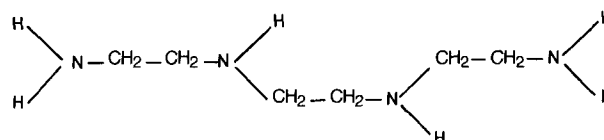
ethylenediamine (EDA)  
CAS 107-15-3diethylenetriamine (DETA)  
CAS 111-40-0triethylenetetramine (TETA)  
CAS 112-24-3

Fig. 1. Chemical structure of EDA, DETA and TETA.

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## Latex contact urticaria presenting as facial swelling in a motor mechanic

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**Key words:** latex; contact urticaria; angioedema, occupational; vehicle mechanic. © Munksgaard, 1997.

Type I allergic reactions to latex usually present as anaphylactic reactions (1, 2) or contact urticaria (3). The prevalence of Type I allergy to latex is rising due to increased use of cheaper, poorer quality latex products such as gloves and condoms (4). Certain professionals, such as surgeons, dentists and nurses, laboratory technicians and patients with urological defects and spina bifida are more prone to latex allergy (5–9).

### Case Report

An 18-year-old trainee vehicle mechanic presented with a 4-month history of recurrent swelling occurring exclusively on his face. He had to attend our Accident and Emergency Department on 2 occasions because of the severity of the facial oedema. Each episode lasted no more than 24 h and was not associated with any specific sequelae or symptoms. Antihistamines were moderately effective. The patient suffered from mild asthma and had a family history of atopy. The rash was related to his work environment, requiring him to lose time. A work place visit was undertaken but no obvious allergens were identified. It was concluded instead that he was suffering from cold urticaria, as his symptoms appeared to be related to working on vehicles adjacent to the garage doors and had occurred through the winter months. Prick tests to brake dust and fluid from the workplace were negative.

He returned later in the summer with a recurrence of the facial urticaria, which had spread to his hands and forearms. He linked this episode directly with the wearing of disposal natural latex gloves provided at his work-

place. RAST to latex showed a grade 2 reaction and skin prick tests to raw ammoniated latex, latex solution (Diagenics, Newark, UK), and the culprit glove gave strong positive reactions. He had no reaction to the negative diluent. Avoidance of all latex products has completely relieved his problem.

### Discussion

Occupational contact urticaria was responsible for 29.5% of all reported occupational dermatoses in Finland 1990–1994 (10). In this series, natural rubber latex was the 2nd most common cause, accounting for 23.7% of all patients with contact urticaria. Engine mechanics ranked 28th (3.9 per 100,00 workers) as an occupation at risk of developing contact urticaria. Motor engineering is an unusual vocation to develop latex allergy. Also of interest is the localized nature of the contact urticaria. For many months, the swelling occurred exclusively on the face. The patient's hands, which were in much closer contact with latex, were unaffected.

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