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WHICH SUBSTANCE IS AN ACTUAL ALLERGEN IN AZO DYES?

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Allergic reactions to textile dyes are well documented. The most common dye sensitizers belong to the disperse azo dyes, which are used for coloring synthetic textile materials (e.g., polyester). Their use is limited in the European Union only in textiles which are labeled as ecological. Several investigations have demonstrated that commercial dyes contain impurities or intentionally added substances, which can be also allergens. Furthermore, in recent years it was demonstrated that human skin and bacteria on it are able to split azo dyes into the corresponding aromatic amines, some of which were sensitizers in the local lymph node assay. Simultaneous contact allergies to one of the most prevalent allergenic azo dye Disperse (D) Orange 1, 4-nitroaniline and p-aminodiphenylamine (PADPA) as well as to other disperse azo dyes and to p-phenylenediamine (PPD) have been reported. Cross-reactivity is one of the possible explanations but theoretically it is also possible that metabolites of the D Orange 1 are the primary sensitizers.

Aim: To investigate the sensitizing capacity of D Orange 1, PADPA and 4-nitroaniline, and the cross-reactivity between these substances and D Yellow 3, its potential metabolites from azo reduction (4-aminoacetanilide and 2-amino-p-cresol) and PPD.

Method: The guinea pig maximization test (GPMT).

Results: It was found that both D Orange 1 and PADPA are strong sensitizer and cross-react with each other. We were unable to sensitize guinea pigs with 4-nitroaniline tested in equimolar concentrations to D Orange 1.

Conclusions: The results indicate that patients sensitized primarily to D Orange 1 will react also to PADPA. PPD, 4-nitroaniline, 4-aminoacetanilide, 2-amino-p-cresol, and D Yellow 3, did not show any cross-reactivity to D Orange 1 or PADPA. 4-nitroaniline cannot be the primary sensitiser in case of sensitisation to D Orange 1. Whether the reactions to D Orange 1 show allergy to this substance per se, or due to its metabolites being the primary sensitisers could probably be elucidated testing these substances in equimolar concentrations and in serial dilutions at challenge in a GPMT.