

The Conundrum of Hair Dye Contact Allergy

an insoluble or very difficult problem

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Medicines -v- Cosmetics Safety

- a cosmetic product **must not cause damage** to human health under normal or reasonably foreseeable conditions of use

Unique for a cosmetic product

- **WARNING:**
 - *Hair dye chemicals can cause allergic skin reactions.*
 - *These can be severe.*



Safety assessment - v - management

Assessment

- DG SANCO - Consumer safety and health protection
- provides independent scientific advice
- **SCCS (formerly SCCP)**

Management

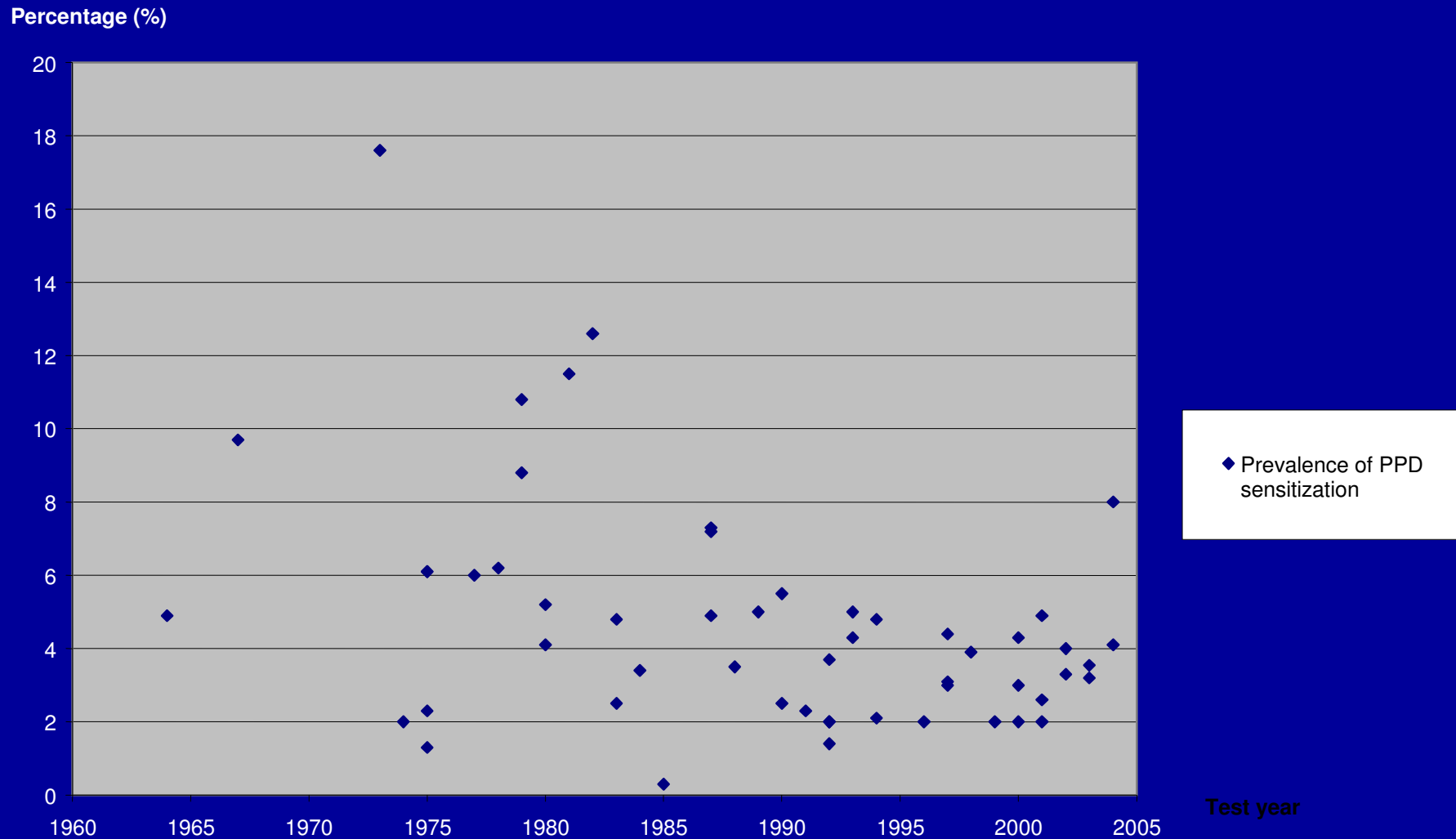
- DG ENTERPRISE - responsible for legal regulation of cosmetics
- (influence of industry)
- Member states

Typical newspaper story ... (1)

- *“A schoolgirl feared she was going to die after she was disfigured by a hair dye which she says left her looking like the Elephant Woman.”*
- *“Stacy, 16, struggled to breathe and was unable to see after her head and neck swelled up.”*



p-phenylenediamine sensitization : European patch test populations



Hair dye contact allergy: is there really no problem?

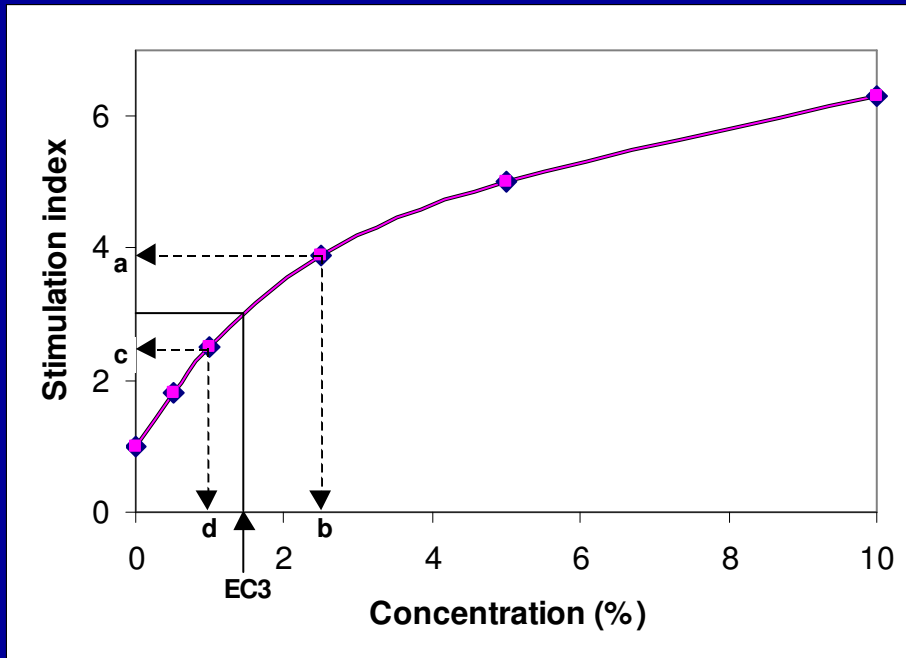
- *Contact allergy and allergic contact dermatitis caused by hair dyes is an important and increasing health problem to consumers and society, often causing acute and severe dermatitis on the face, scalp and neck.*
 - epidemic?
 - endemic?
 - hyper endemic?



Is it really not caused by hair dyeing?



LLNA relative potency of allergens



oxazolone	0.01	extreme
methylchloroisothiazolinone	0.05	extreme
<u>p-phenylenediamine</u>	<u>0.06</u>	<u>extreme</u>
dinitrochlorobenzene	0.08	extreme
formaldehyde	0.4	strong
methyldibromo glutaronitrile	5.2	moderate
mercaptobenzothiazole	9.7	moderate
hydroxyisohexyl 3-cyclohexene carboxaldehyde	17.1	moderate

Category	EC3 value (%)
extreme	≤ 0.2
strong	$> 0.2 - \leq 2$
moderate	> 2

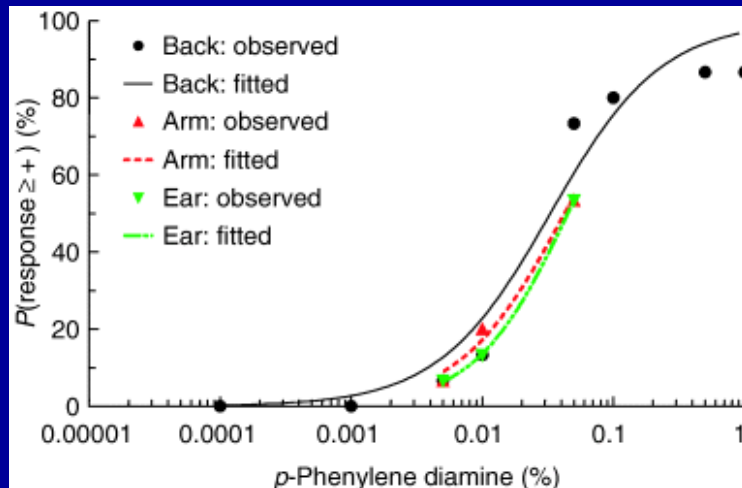
EC3 values

p-Phenylenediamine	0.06%	extreme
1,2,4-Trihydroxybenzene	0.08%	extreme
Dihydroxyindole	0.17%	extreme
6-Hydroxyindole	0.2%	extreme
4-Nitro-o-phenylenediamine	≤0.05%	extreme
HC Red n° 1	<2%	strong
3-Nitro-p-hydroxyethylaminophenol	0.07%	extreme
4-Amino-2-hydroxytoluene	0.44%	strong
N,N-bis(2-hydroxyethyl)-p-phenylenediamine sulfate	<0.25%	strong
4-Amino-m-cresol	1.45%	strong
Hydroxyethyl-3,4-methylenedioxyaniline HCl	<0.5% b	strong

- *Until now ... opinions on substances, for which the dossiers submitted by industry have been assessed, have largely concerned the general toxicology of the substances*

SCCP Memo : EC statement

- Hair dye substances which fulfil the criteria for classification as R43, may not be safe for consumers.
- This is particularly so for hair dye substances categorised as extreme and strong sensitizers.

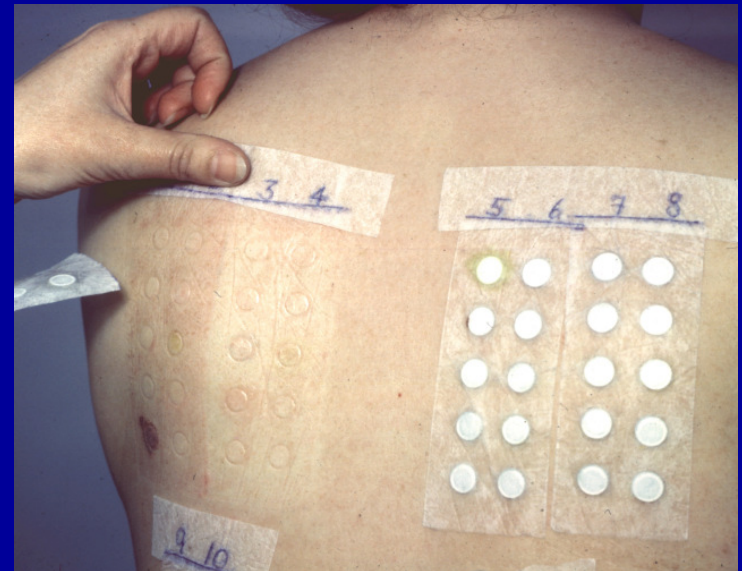


after Sosted

- The Commission services will now extend their assessment in order to **minimise possible risks of allergic reactions** caused by hair dyes.
- **Epidemiological studies** are necessary to examine the extent of skin allergies to hair dyes in the EU's population.
- **Threshold values for sensitizers** of high concern need to be determined to take appropriate measure on a possible decrease of exposure.

Products for diagnosis

- *a product intended for the diagnosis of allergic reactions is to be authorised according to Directive 2001/83/EC*



Directive 2001/83/EC

- *Article 1: Medicinal product:*
- (a) Any substance or combination of substances presented as having properties for treating or preventing disease in human beings; or
- (b) Any substance or combination of substances which may be used in or administered to human beings either with a view to restoring, correcting or modifying physiological functions by exerting a pharmacological, immunological or metabolic action, or to making a medical diagnosis.
- *Immunological medicinal product:*
- Any medicinal product consisting of vaccines, toxins, serums or allergen products:
- (b) 'allergen product' shall mean any medicinal product which is intended to identify or induce a specific acquired alteration in the immunological response to an allergizing agent.
- *Article 2: Scope:*
- In cases of doubt, where, taking into account all its characteristics, a product may fall within the definition of a 'medicinal product' and within the definition of a product covered by other Community legislation the provisions of this Directive shall apply.

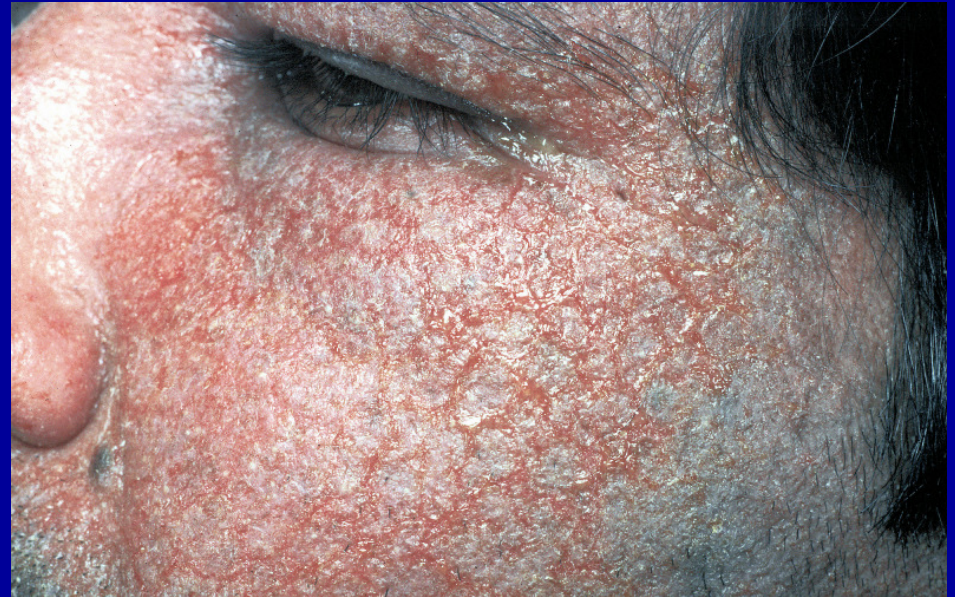
Self testing - background

- Some hair dyeing products placed on the Community market contain the advice to assess skin sensitisation by performing a user test before dyeing the hair (“self tests”). To this end, the labelling advises to apply a small quantity of the hair dye on the skin.
- COLIPA, in a “recommendation” on “Warnings on oxidising hair colouring product for consumer use” recommends: “Perform a skin allergy test 48 hours before each product use”.
- Some Member States have concerns and point at possible risks stemming from self tests.



Self testing – mandate to SCCP

- Does the SCCP consider that there is a risk that:
 - Self-tests lead to false-negative results?
 - Self-tests lead to induction of contact allergy?
- Does the SCCP consider that self-tests are beneficial for a specific population of hair dye users in order to detect existing sensitisations?



Recommended self test

- amount of substance applied is “a small amount”
 - application time 45 minutes to 48 hours
- concentration of hair dye substance unknown
 - product is tested ‘as is’
 - up to 4% PPD :
 - such exposure may induce sensitisation
 - concentration may also be much lower than that known to be relevant in patch testing
 - result may be false negative
- reading time is up to 48 hours
 - known to be too short
 - patch test reactions may develop up to 7 days after application
 - allergy may be missed
- testing behind the ear
 - how the reaction than can be assessed by the subject?
 - diagnostic patch testing done on upper back for reproducibility
- application is open
 - clinical diagnostic patch testing is by occluded application
 - readings by trained observers



Self testing hair dyes- conclusions

- When a hair dye product is applied to the skin for the purpose of providing an indication as to whether the individual consumer may or may not have contact allergy to hair dye chemicals(s), the product is being used for *in vivo* diagnostic purposes.
- There is a risk that “self tests” with hair dye products and with separate kits lead to misleading and false-negative results,
- There is potential risk that “self tests” result in induction of skin sensitisation to hair dye substances.
- Self testing may offer protection to those individuals who perform the recommended test and develop a positive reaction. However, the proportion of hair dye chemical allergic individuals who do produce a positive reaction from this *in vivo* diagnostic test is unknown.



Typical newspaper story ... (2)

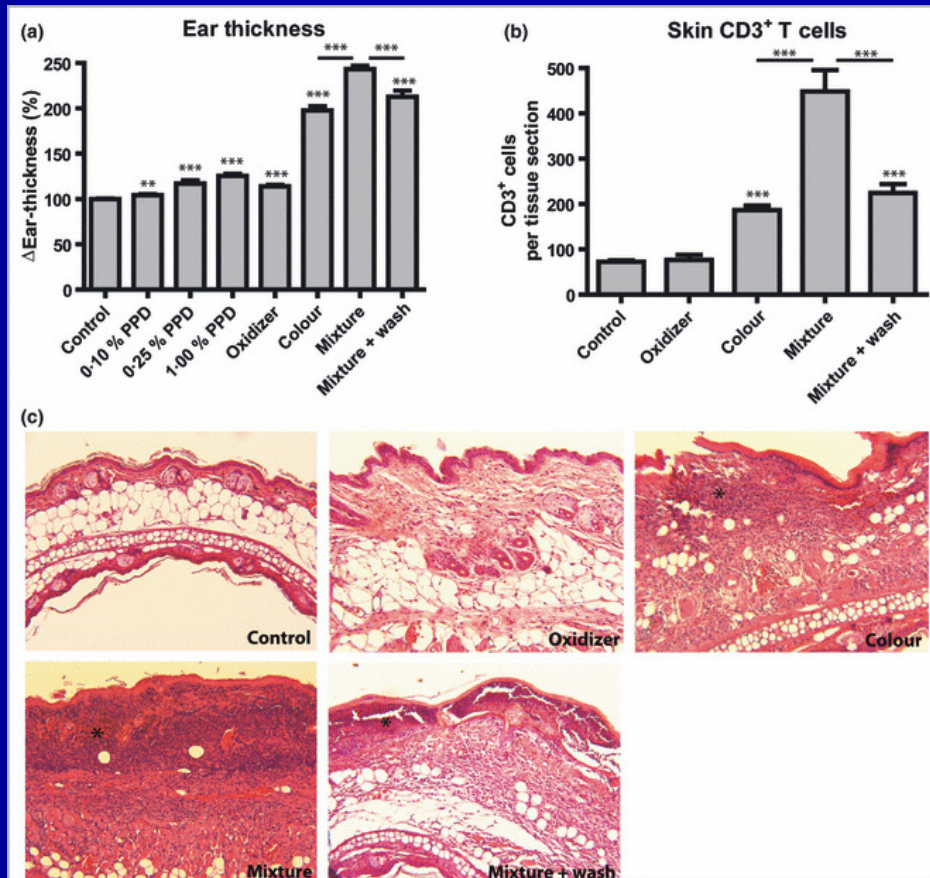
Subject

- "I did the 48-hour patch test behind my ear and there was no reaction, so two days later I put the dye on my hair," she said.
- "But soon afterwards my scalp started itching horribly. I wanted to tear my head off. The following day my hairline went bright red, I felt really hot, and the sides of my neck hurt as if the glands were swollen."

Public Relations

- .. safety has been repeatedly confirmed by the scientific community and regulatory authorities alike.
- Reactions to hair colorants are extremely rare.
- ... reactions can be avoided by carrying out the skin allergy test as instructed, 48 hours before you wish to use the product. This test is proven to be 100% predictive.
- Consumers can continue to use ... with complete confidence.
- Esra, Director of Corporate Communications & External Affairs, L'Oreal UK

Consumer available permanent hair dye products cause major allergic immune activation in an animal model



- Data show that permanent hair dyes available to the consumer are potent skin sensitizers.
- Current safety assessments of commercial products and regulatory actions are based on data from testing individual chemical substances.
- Results demonstrate that the sensitizing potential of in-use hair dyes is greater than that of the separate components.
- In the interests of public health, regulation of products should be based on the toxicological analysis of the single ingredients as well as the chemical composition to which the consumer is exposed.

The epidemic of hair dye allergy: Need for evidence based prevention

- I. **Epidemiology**
 - Incidence and prevalence
 - Risk factors
 - Thresholds
- II. **Characterisation of hair dye exposed individuals**
 - Sensitisation –v- tolerance
 - Skin enzymes
- III. **Clinical patterns and mechanisms**
 - Role of protein degradation products
 - Histamine release by hair dye ingredients *in vivo*
 - Histological findings in patch test reactions
- IV. **Exposure assessment**
 - Absorption through skin
 - Release of monomer from dyed hair
 - Causative products, ingredients and concentrations
 - Glove protection – efficacy
- V. **Allergen identification and improved diagnosis**
 - *In vivo* screening tests with extended patch test series
 - New *in vivo* screening method using dendritic cells
 - Validation of *in vitro* T-lymphocyte activation assay

