

research organization.

Response of 30% or more is considered as positive in GPMT. Response of 15% or more is considered as positive in Buehler test. Stimulation Index (SI) should be 3 or more in LLNA. Other animal tests which are validated would be taken into account.

Our research group reviewed the criteria in German DFG (2), ECB (3) and German dermatologist group (7) and ACGIH (8), revised the criteria of JSOH (5) and reclassified 28 German DFG (2) which were not listed in JSOH (5) using our new criteria for sensitizer (6).

RESULTS

We could reclassify 24 sensitizers correctly (Table D). However, butane oxime, m-chloroaniline, 1,5-diaminonaphthalene and 3,4-dichloroaniline could not be classified by our new criteria.

Therefore two members of our research group visited the secretariat of the commission for the investigation of health hazards of chemical compounds in the work area in Freising, Germany. We got the evidenced papers of these four substances. We found out new papers in butane oxime (9,10,11) and m-chloroaniline (12,13). We could reclassify these two substances. However, the evidenced papers of 1,5-diaminonaphthalene and 3,4-dichloroaniline were chemical company secret data. We could not classify these two substances at last.

DISCUSSION

To adopt the evidences of human and animal studies is the trend of the criteria for sensitizer in the world (1,2,3,5,7). Our research group made the new criteria for sensitizer (6) which adopted the evidences of animal studies and performed the validation study of the criteria using German DFG sensitizers (2).

The result of validation study was that 26 of 28 sensitizers could be classified by our new criteria. We concluded that this validation study was successful, this criteria were practical and that number of sensitizers should be expanded.

Furthermore, under the new European Union (EU) Registration, Evaluation and Authorization of Chemicals (REACH) rules, all chemicals in the EU that are produced or imported in quantities of more than one ton per annum will need to be assessed as potential human and environmental hazards, for example, in terms of their carcinogenicity; human sensitivity to such chemicals will also need to be determined. REACH calls for increased use of hazard assessment alternatives such as *in vitro* methods and quantitative structure-activity relationships (QSARs). Since no *in vitro* replacement is currently available for skin sensitization, nor is expected to be ready in the near future, the use of QSAR approaches presents an attractive alternative (14). The legislative trend towards the abolition of the animal testing of cosmetic products in the seventh Amending Directive 2003/15/EC to Cosmetics Directive 76/768/EEC includes a demand for alternative evaluation procedures (15). We made QSAR models for skin and respiratory sensitizer using ADMEWORKS/ModelBuilder software (Fujitsu Kyushu Systems Limited, Japan) (16).

*members of the research group of classification and listing of sensitizer are as follows:

Chairman: Yukinori Kusaka (University of Fukui)

Advisory: Toshio Matsushita (University of Kagoshima)

Member: Kohji Aoyama (University of Kagoshima)

Atsushi Ueda (Kumamoto University)

Kohichi Harada (Kumamoto University)

Keiko Minamoto (Kumamoto University)

Takemi Otsuki (Kawasaki Medical School)

Kunihiko Yamashita (Daicel Chemical Industries)

Tatsuya Takeshita (Wakayama Medical University)

Eiji Shibata (Aichi Medical University)

Kazuhiro Sato (University of Fukui)

Tomohiro Umemura (University of Fukui)

Taro Tamura (University of Fukui)
Muneyuki Miyagawa (National Institute of Occupational Safety and Health)
Masaaki Kaniwa (National Institute of Health Sciences)
Kunio Dobashi (Gunma University)
Satomi Kameo (Gunma University)
Tetsuhito Fukushima (Fukushima Medical University)
Takahiko Yoshida (Asahikawa Medical University)

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Table I. Results of reclassifying German DFG sensitizers by our new criteria

Abietic acid(Sh)(514-10-3)	Skin 1
Acrylamide(Sh)(79-06-1)	Skin 2
2-Aminoethanol(Sh)(141-43-5)	Skin 2
Ammonium persulphate(Sa)(7727-54-0)	Airway 1, Skin 1
α -Amylase(Sa)(EC3.2.1.1)	Airway 1
α -Amylcinnamaldehyde(Sh)(122-40-7)	Skin 2
Aniline(Sh)(62-3-3)	Skin 1
Benomyl(Sh)(17804-35-2)	Skin 1
Benzylalcohol mono(poly)hemiformal(Sh)((14548-60-8)	Skin 2
Brolemain(Sa)(9001-00-7)	Airway 2
1,4-Butanediol diacrylate(Sh)(1070-70-8)	Skin 3
Bithionol(SP)(97-18-7)	Skin 2
Butane oxime(Sh)(96-29-7)	*Skin 3
<i>n</i> -Butyl glycol ether(BGE)(Sh)(2426-08-6)	Skin 2
<i>n</i> -Butyl methacrylate(Sh)(97-88-1)	Skin 2
<i>p</i> -tert-Butyl phenol(Sh)(98-54-4)	Skin 2
Butynediol(Sh)(110-65-6)	Skin 2
Chloroacetamide-N-methylol(Sh)(2832-19-1)	Skin 2
<i>m</i> -Chloroaniline(Sh)(108-42-9)	*Skin 2
Dicyclohexylcarbodiimide(Sh)(538-75-0)	Skin 2
1-Chloro-2,4-dinitrobenzene(Sh)(97-00-7)	Skin 1
Cinnamaldehyde(Sh)(104-55-2)	Skin 2
Chlorothalonil(Sh)(1897-45-6)	Skin 1
Cinnamyl alcohol(Sh)(104-54-1)	Skin 2
4,4-Diaminodiphenylmethane(Sh)(101-77-9)	Skin 1
1,5-Diaminonaphthalene(Sh)(2243-62-1)	*Difficulty
1,2-Dibromo-2,4-dicyanobutane(Sh)(35691-65-7)	Skin 2
3,4-Dichloroaniline(Sh)(95-76-1)	*Difficulty

*Difficult to classify

