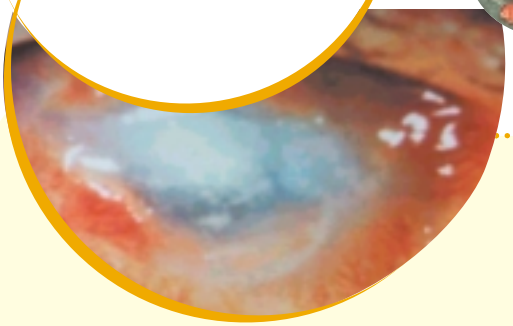
CE 0459

PREVOR

ANTICIPATE AND SAVE

Toxicology Laboratory & Chemical Risk Management

The chemical burn



Two categories of chemicals can provoke a burn by a direct contact: corrosives and irritants.
The seriousness of the chemical burn depends on the number of cells destroyed and will be more significant in the case of corrosives. In some cases, the aggressive product can also have toxic or harmful effects, the consequences of which should not be neglected.

▪ The aggressive chemicals

CORROSIVE

Concentrated Acids and bases

IRRITANT

Solvents, oils…

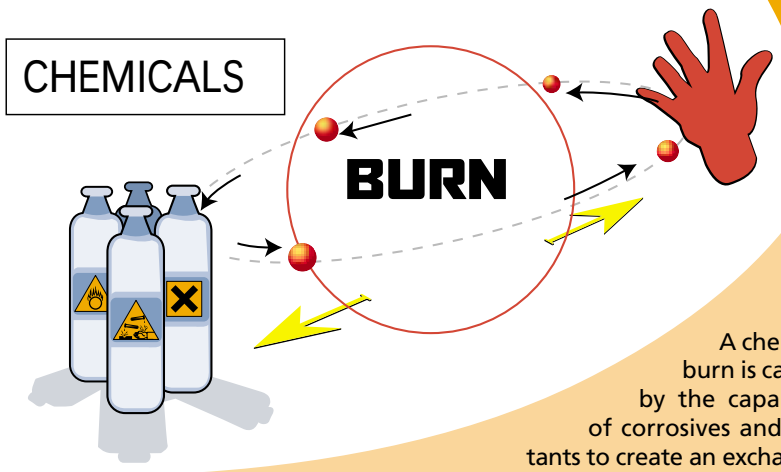
SIGNIFICANT REACTIONS → **IRREVERSIBLE EFFECTS**

WEAK REACTIONS → **REVERSIBLE EFFECTS**

Risk of **generalised toxicity**

▪ The mechanism of a chemical burn

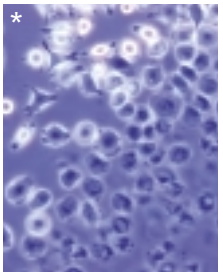
THE EXCHANGE



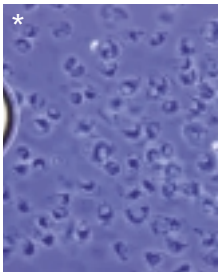
A chemical burn is caused by the capability of corrosives and irritants to create an exchange (ion, proton, electron…) with the tissue of the skin or the eye. The degree of the burn will depend on the number of molecules destroyed and on the type of modification (reversible or irreversible)

▪ The action of soda NaOH:

Healthy cells as seen under a microscope



Addition of soda 0.5N (2%)



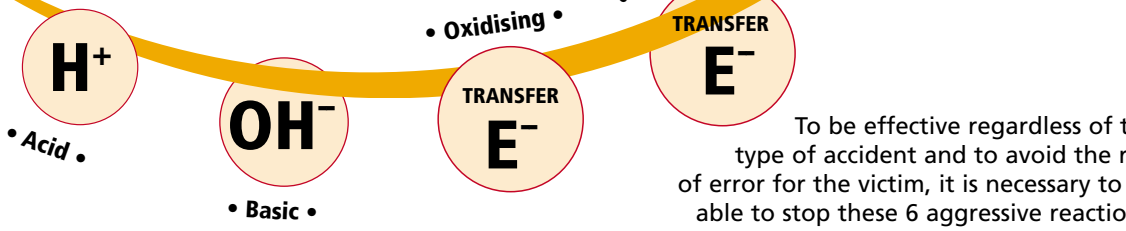
Cells are completely destroyed

* *Picture source: ACTO, Prof. Norbert Schrage, Aachen.*

The principles of emergency washing

To stop the aggressive reactions

- There are 6 types of aggressive chemical reactions



To be effective regardless of the type of accident and to avoid the risk of error for the victim, it is necessary to be able to stop these 6 aggressive reactions.

A POLYVALENT PRODUCT IS ESSENTIAL

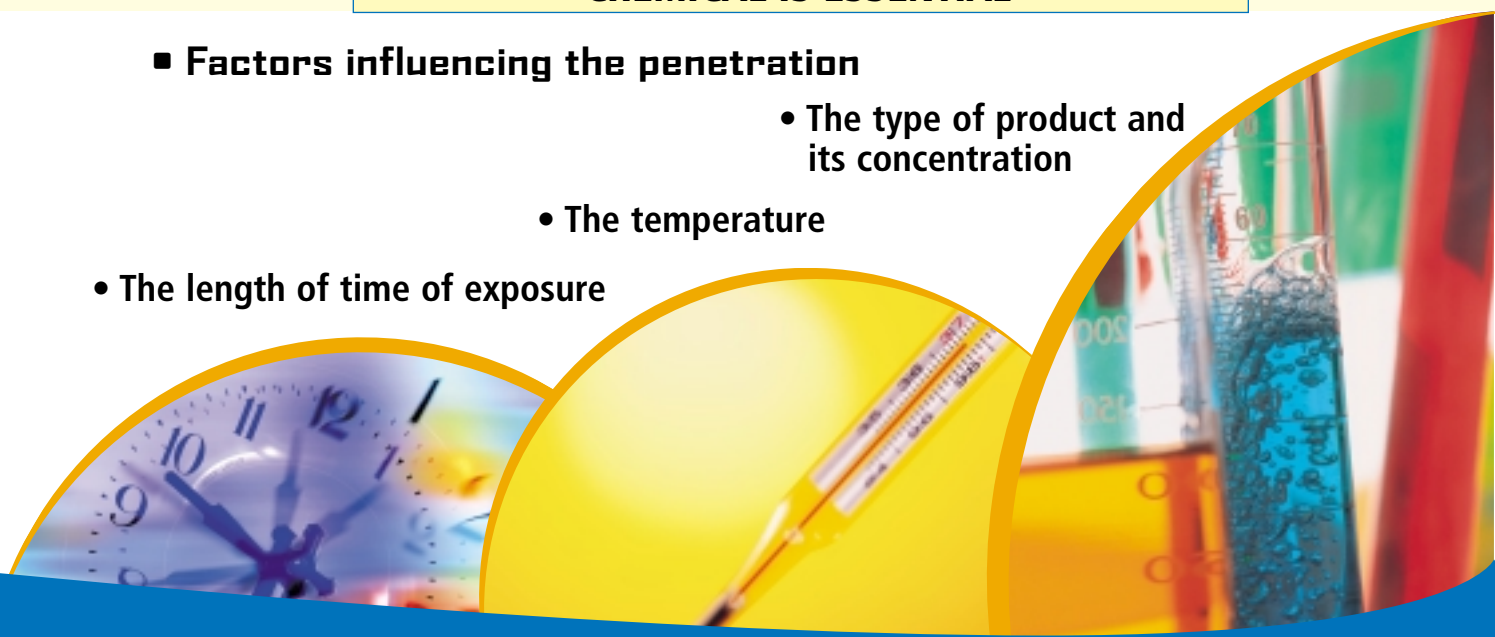
To stop the evolution of the burn

A chemical burn is initiated by the contact between the aggressive product and the skin or eye. Following this contact, part of the aggressive chemical will penetrate into the tissue and cause destruction of the cells.
To effectively decontaminate the splash, it will be necessary, not only to decontaminate the product on the surface, but also to control its penetration inside the tissue.

A PRODUCT ABLE TO STOP THE AGGRESSIVE CHEMICAL IS ESSENTIAL

■ Factors influencing the penetration

- The type of product and its concentration
- The temperature
- The length of time of exposure



First-aid treatment:

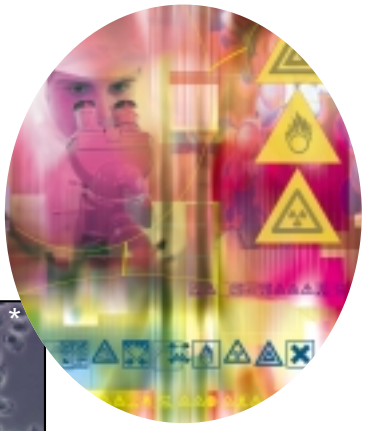
From water...

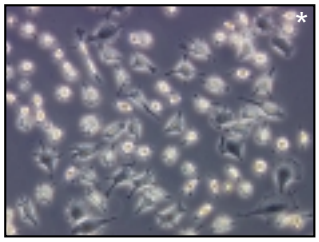
The principles of washing with water

- washing of the surface to remove quickly the aggressive product
- dilution of the chemical to reduce its aggressiveness
- a universal product avoids the risks of error at the time of the accident

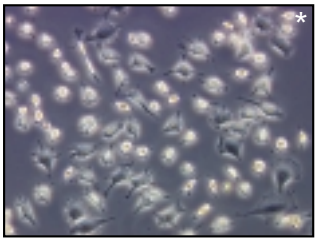
What are its limitations?

- concentrated products which penetrate very quickly
- the intervention time of 10 seconds which is not always achievable
- washing comfort : risk of hypothermia under a water shower
  difficulty to open the eye

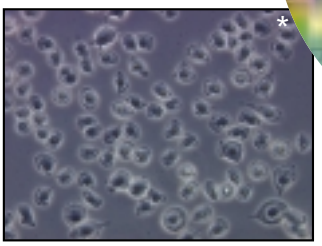




Healthy cells as seen under a microscope



The beginning of washing: water penetrates inside the cells and makes them expand.



The end of washing : cells are destroyed because water causes them to burst.

The ideal product in case o

Retain the advantages of water:

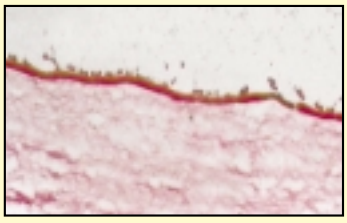
- Fast washing of the surface
- Single protocol

In vitro tests

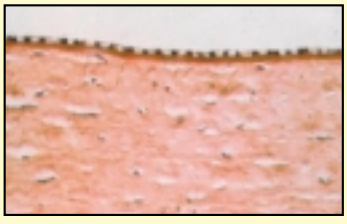
The effectiveness of Diphoterine® has been tested on more than 600 chemicals belonging to the various classes of aggressive products (acids, bases, oxidising agents, etc…) within the Prevor laboratories. This list is available on our web site.

In vivo tests

Application of soda on rabbits' corneas:



Washing with water: 100% of the endothelial cells are destroyed



Washing with the Prevor solution : 95% of the endothelial cells are preserved

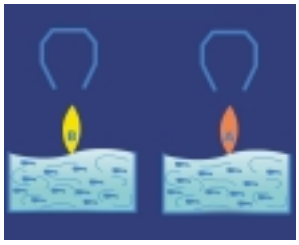
P. Josset, B. Belosse, J. Blomet, H. Saraux, Intérêt d'une solution isotonique dans le traitement précoce des brûlures chimiques basiques cornéo conjonctivales. Bull Soc Opht France 1986, 6-7, LXXXVI.

* *Picture source: ACTO, Prof. Norbert Schrage, Aachen.*

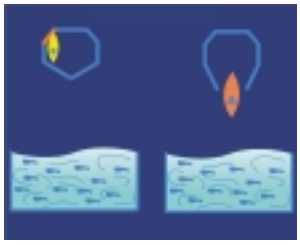
...to Diphoterine®

• The principles of washing with Diphoterine®

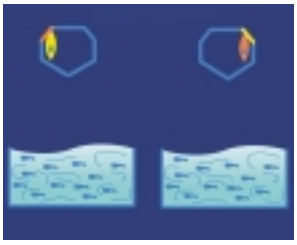
- It is a liquid which enables it to obtain the same effect as water on the surface of the skin or eye
- Diphoterine® is a chelating amphoteric agent, which enables it to stop the aggressiveness of the chemicals in a polyvalent way. *
- The Diphoterine® mechanism can be illustrated as follows:



Diphoterine® will attract the chemical in contact with the tissue

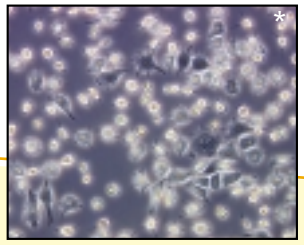


The acid site of Diphoterine® will fix base to make them harmless

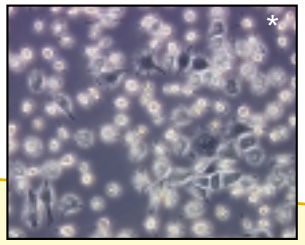


The basic site of Diphoterine® will fix acid to make them harmless

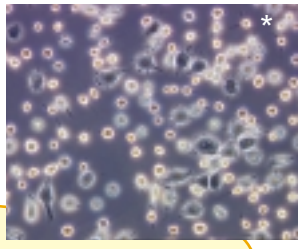
- Diphoterine®, unlike water, will **stop the penetration** of the chemical.



Healthy cells as seen under a microscope.



Beginning of the washing with Diphoterine®: the cells contract slightly



End of the washing: the cells are preserved.

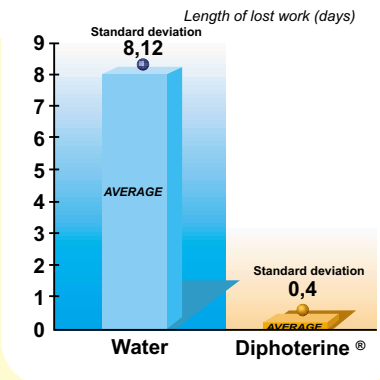
f a chemical splash must:

Bring improvements to compensate for the limitations of water:

- guarantee a total efficacy whatever the product
- Increase the intervention time
- Improve washing comfort to increase the effectiveness

Results

The effectiveness of Diphoterine® has been proven in industry through many reported and published cases of accidents (complete bibliography available on Internet)
At Martinswerk (Germany), the effectiveness of Diphoterine® was compared with the effectiveness of water on 45 splashes with soda.
The results can be obtained in the following table:



Series of cases in industry:

The introduction of Diphoterine® enabled a reduction in the average duration of days lost from work to a few hours.
The standard deviation experienced in this case reduced from 8.12 to 0.4, which illustrated that Diphoterine® provided a more reliable first-aid treatment following a chemical splash.

* *For HF and its derivatives, use Hexafluorine®*

How to use

A sterile washing solution

Dispensers for the skin, in the form of micronised sprays (optimising the surface of contact)

DAP

MINI DAP

MICRO DAP

> To decontaminate an entire body

Typical equipment for locations where there are large quantities of chemicals :
- Production areas
- Warehousing areas
- Off-loading and decanting areas

> To decontaminate a limb or a torso

An ideal complement for a Wall Mounted Eyewash, where the quantities of chemicals are limited:
Laboratories

> To decontaminate a face or a hand

Ideal personal equipment for small splashes:
Workshops
Maintenance personnel

Washing must begin within the first minute of the splash

Protocol for th in th

1/ Go away from the danger

2/ Get undressed

The Diphoterine® ?

To be used immediately after the accident

Dispensers for the eyes, equipped with an ergonomic eyecup, which assists the opening of the eye for a more effective washing

LPM Portable mural eyewash

Portable Eyewash

SIEW

> To decontaminate an eye and the skin

In locations where fixed equipment is well adapted:
- Laboratories
- Production areas
- Warehousing areas
- Off-loading and decanting areas

Washing must begin within the first minute of the splash

> To decontaminate an eye

In areas where the equipment must be portable:
- First-aid boxes
- Medical centre
- Emergency vehicles

> Personal equipment to decontaminate an eye:

Ideal for the maintenance personnel

Washing must begin within the first 10 seconds of the splash

ne first aid intervention with Diphoterine®
e event of a chemical splash

3/ Wash as quickly as possible, respecting the instructions for use of Diphoterine®

4/ Alert

5/ Seek medical advice

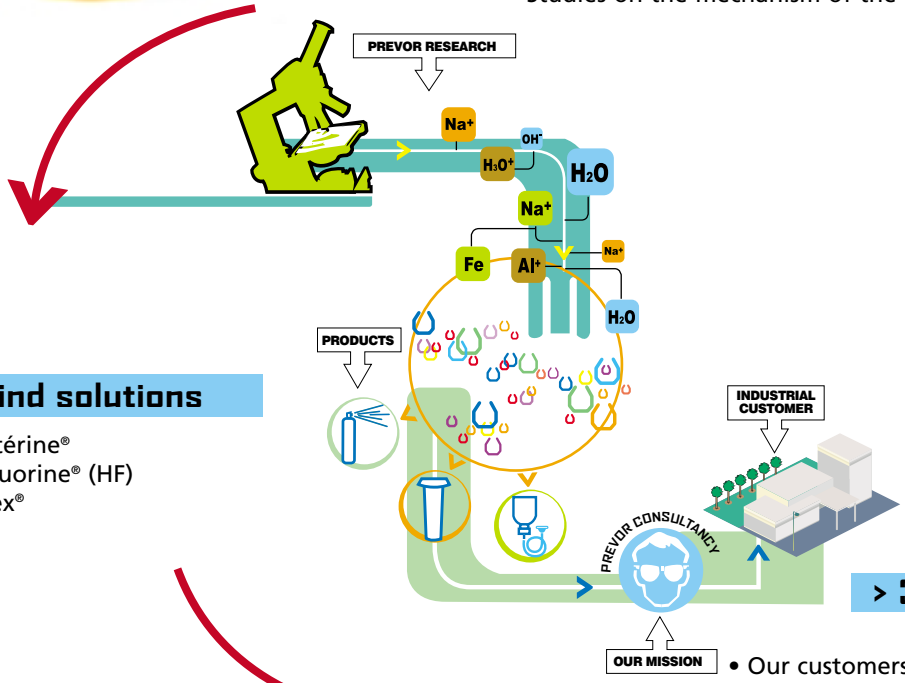
PREVOR

Science to improve the safety

Our Missions

> 1/To understand the chemical products

Research on the toxicity of the products
Studies on the mechanism of the burn



> 2/To find solutions

=> Diphotérine®
=> Hexafluorine® (HF)
=> Trivorex®

> 3/To advise

- Our customers for a more effective use (advice on site, training of the users and consultants, edition of informative works regarding our knowledge)
- Institutions involved with the chemical risk

Reference organisations
They trust us

3M FRANCE - ADP - AIR FRANCE - AKZOL NOBEL - ALCATEL - ARJO WIGGINGS - ASTRA - ATOCHEM - BASF PEINTURES ET ENCRES - BAYER POLYSAR FRANCE - BEGHIN SAY - BOEHRINGER INGELHEIM - BP CHEMICALS - CALAIRE CHIMIE - CALCIA - CEA - CITERNORD - COCA COLA PROD - COGEMA - COMPAGNIE GÉNÉRALE DES EAUX - CRISTAL UNION - CRISTALLERIE D'ARQUES - DANONE - DE CARBON - DE DIETRICH - DUPONT DE NEMOURS - EDF - ELF - ESSILOR INTERNATIONAL - GEC ALSTHOM - GENERAL ELECTRIC - GENERAL DES EAUX GLAENZER SPICER - GLAXO - GOODYEAR - GSK - GUERBET - GUERLAIN HEINEKEN - HENKEL FRANCE - HBL - HOËCHST L'AIGLE - ICI - JAGUAR CARS LABORATOIRES ECLAIR - LIPHA - L'ORÉAL - LUBRIZOL FRANCE - LYONNAISE DES EAUX - MICHELIN - MUSÉE D'ORSAY-LOUVRE - ORIL-SERVIER - PASTEUR VACCINS PEUGEOT - PFIZER - PHILIPS CI - PPG INDUSTRIES FRANCE - RECKITT ET COLLMAN RENAULT - RHÔNE POULENC - ROHM AND HAAS FRANCE - ROQUETTE FRÈRES SAFT - SAINT-GOBAIN - SCHLUMBERGER - SNCF - SOLLAC - SOLWAY ET CIE SOPAD NESTLÉ - TRW - UGINE - VALLOUREC...

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