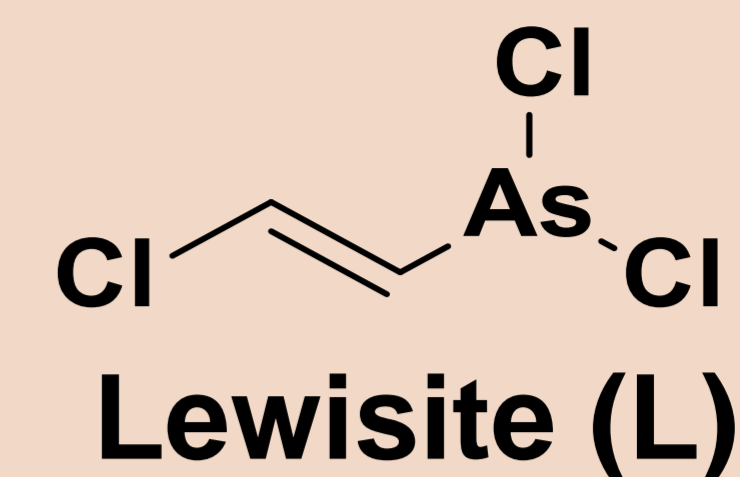
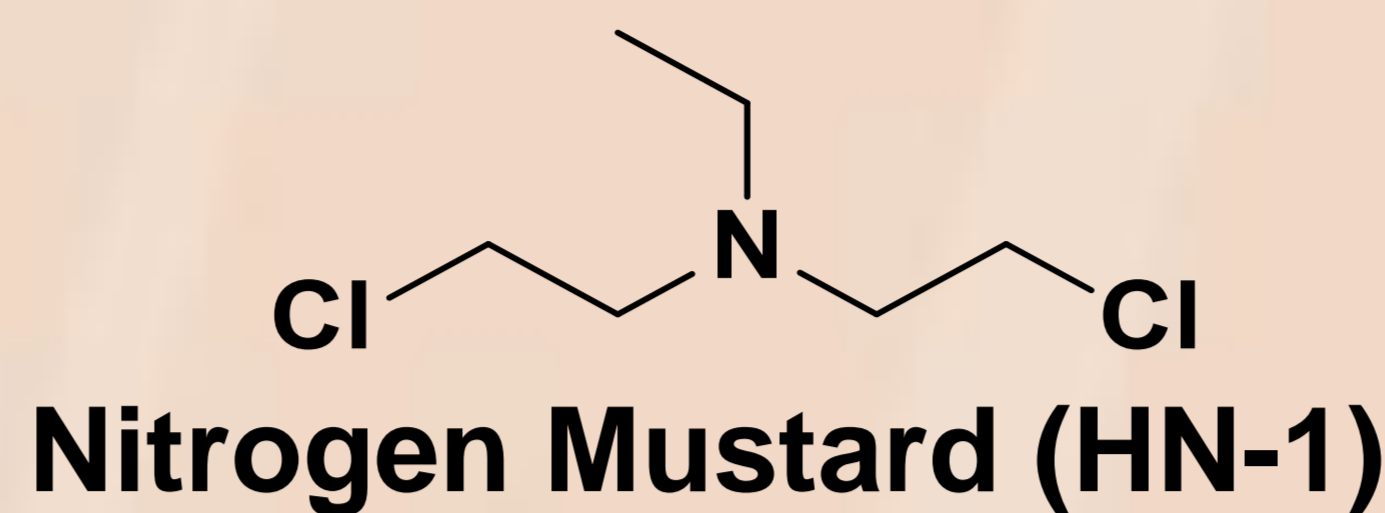
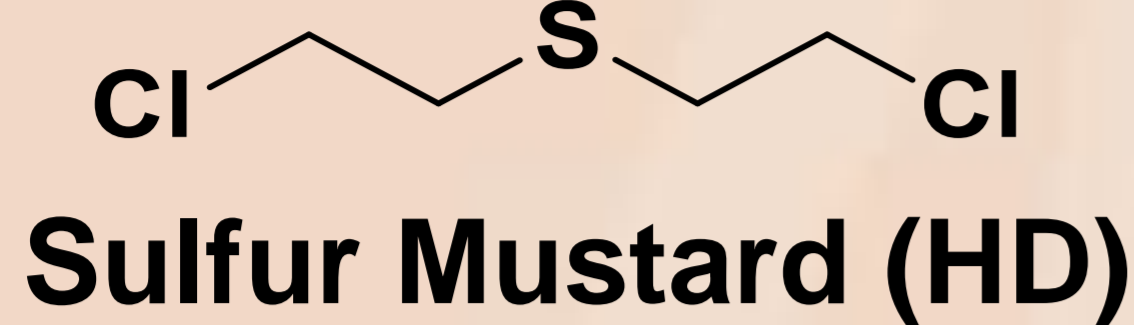




# Blister Agents and their Countermeasures

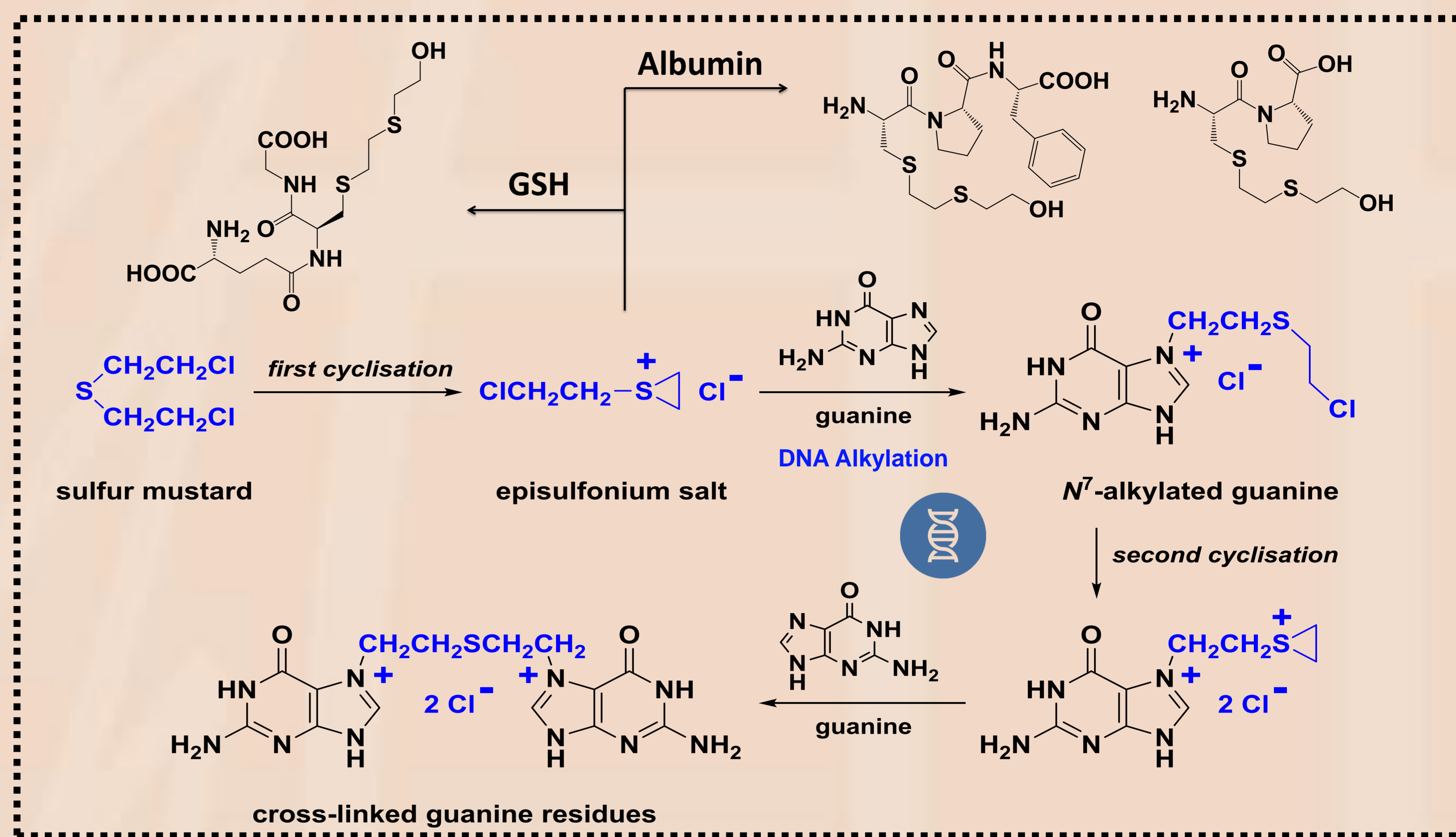
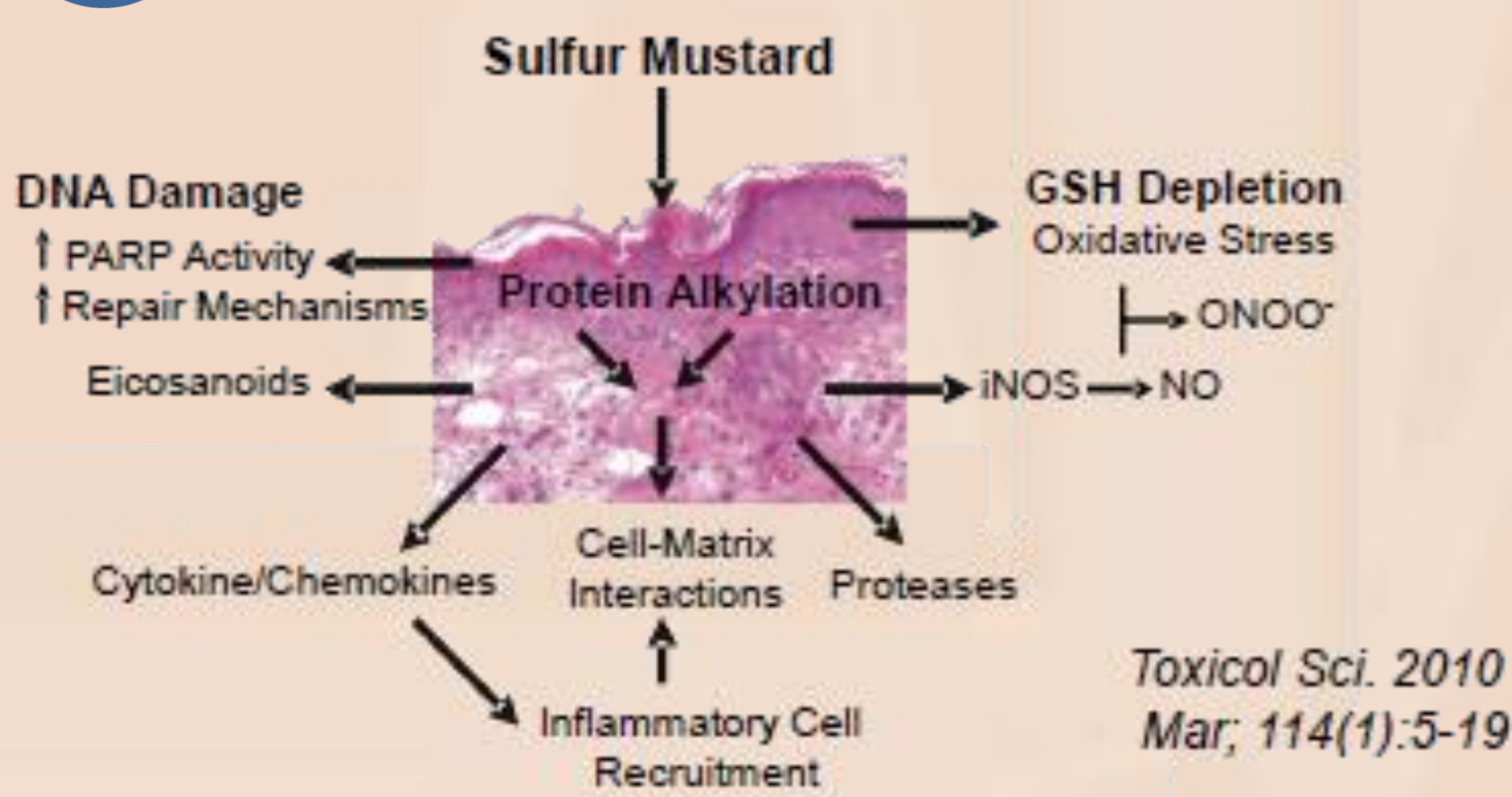
Examples of blister agents:



## Effects of sulfur mustard



- Reddening of the skin
- Resembling sunburn
- Swollen skin
- Lesions
- Pain



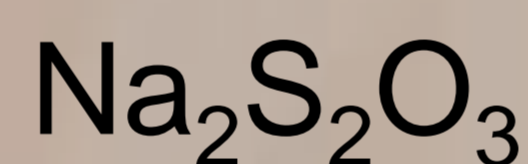
Blister agents alkylate biological molecules such as nucleic acids, proteins and cellular membrane components. This results in a cascade of complications. Alkylation and cross linking of DNA can lead to a risk of cancer.

## Countermeasures including supportive measures

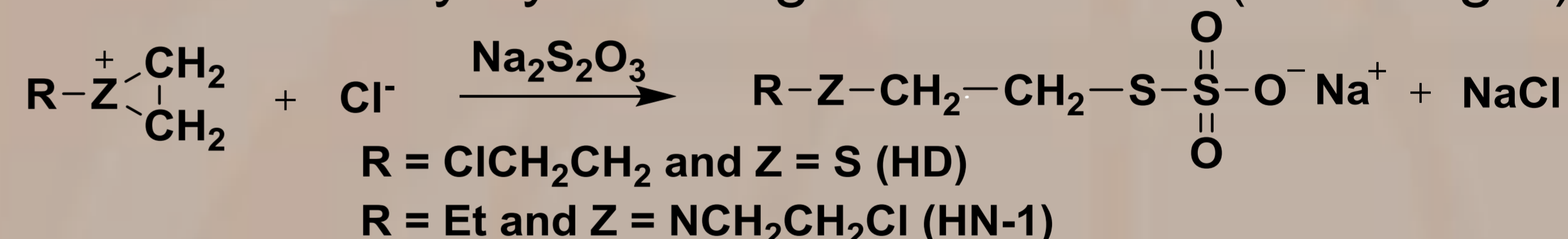
### Structure

### Effect

**Sodium Thiosulfate**  
(administered intravenously)



Prevents lethality by reacting with mustard (scavenger).



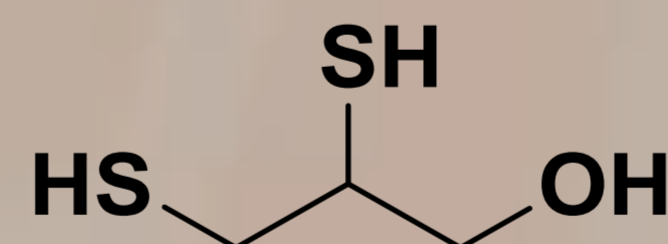
## Reactive Skin Decontamination Lotion – RSDL

A Mixture of Dekon 139 and 2,3, butanedione monoxime (DAM) in a polyethylene glycol monomethyl ether (MPEG) and water solvent system (also works as a countermeasure against organophosphorus agents). Commercially available, [www.rsdl.com](http://www.rsdl.com).

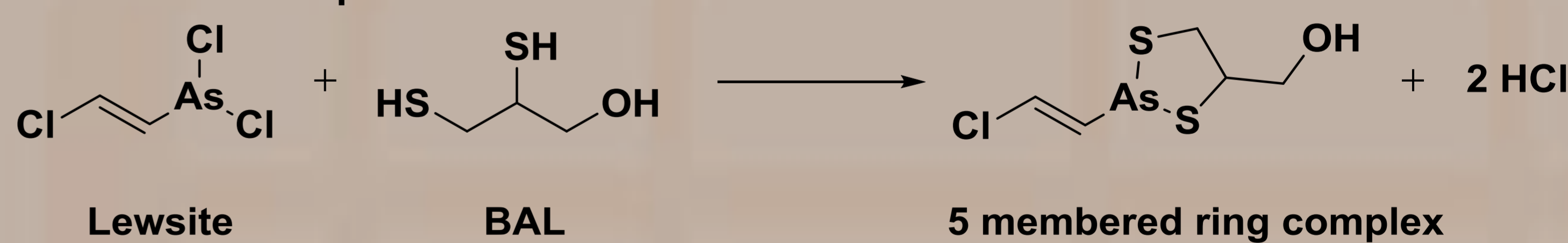


Prevents dermal absorption and rapidly neutralizes the vesicant chemical

**BAL (British Anti Lewisite)**  
(administered intramuscularly)

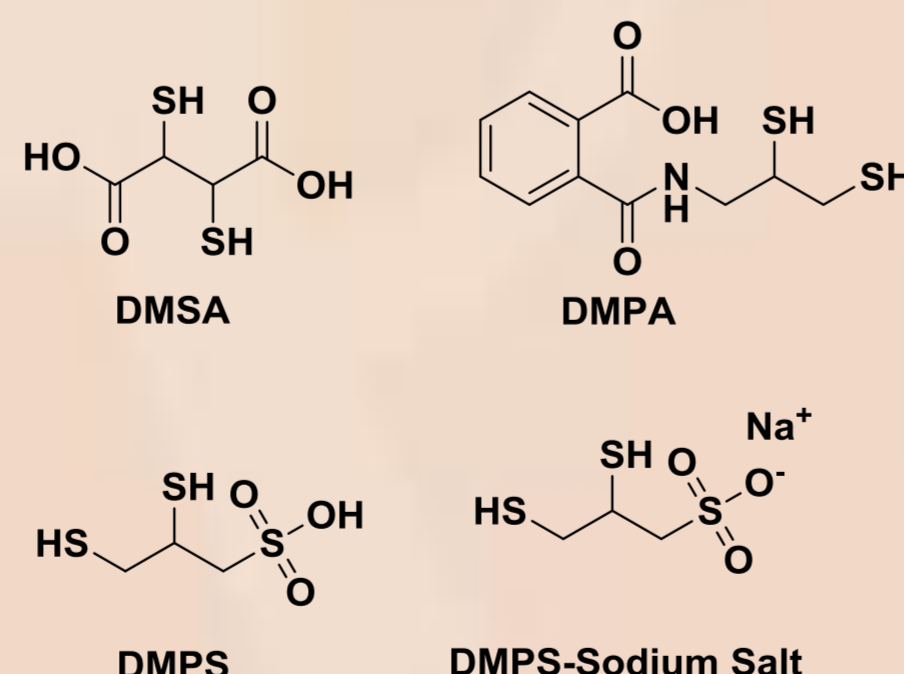


Chelating agent that binds to Lewisite to form a water soluble complex.

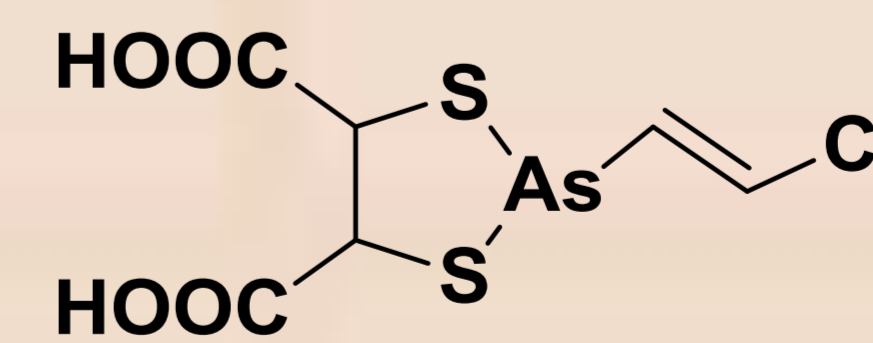


DMSA  
DMPS  
DMPA

**DMPS-Sodium Salt**  
(used for Lewisites)

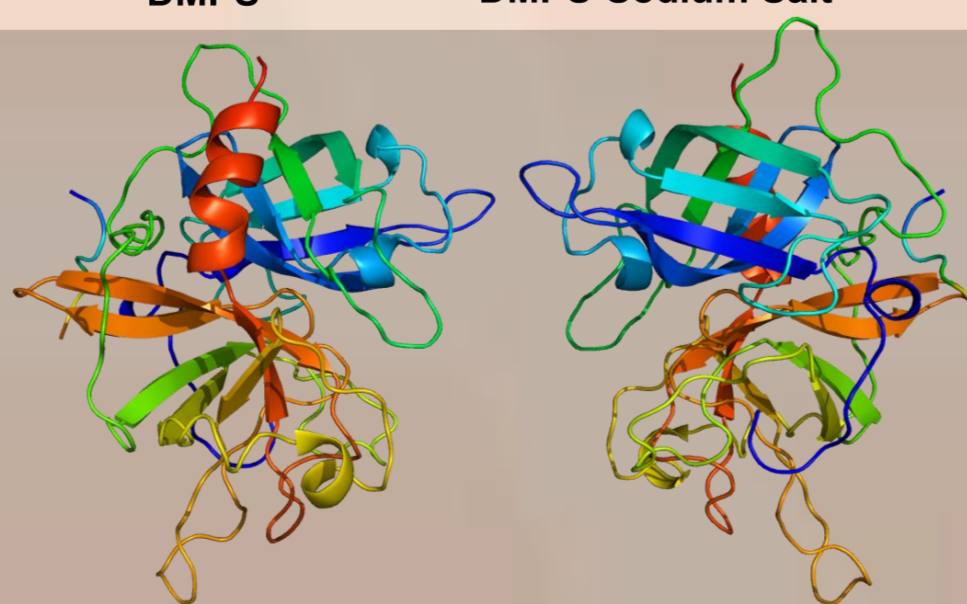


These chelating agents bind to Lewisite to form water soluble complexes.



**Tissue plasminogen activator (tPA)**  
(Experimental therapeutic, administered intravenously)

*Am J Respir Cell Mol Biol. 2013 Apr; 48(4): 439-447*



Diminishes airway obstructive fibrin-containing casts; this improves clinical respiratory distress, pulmonary gas exchange and tissue oxygenation.

## Sodium Hypochlorite

Can be used as a skin decontaminant. However, it is not a recommended treatment due to caustic properties.



Oxidizes (and inactivates) blister agents.

