

ENGLISH ONLY

Ad Hoc Committee on Chemical Weapons

THE NETHERLANDS

Verification of alleged use of chemical warfare agents: retrospective immunochemical detection of exposure to mustard gas

SUMMARY

It is argued that unequivocal methods are needed to verify exposure of alleged victims to chemical warfare agents, in order to sustain the credibility of the forthcoming Chemical Weapons Convention. Since samples for analysis can often be obtained only several days after exposure or later, the methods should be very sensitive and should relate to long lasting, specific effects of the CW agent involved.

In this context immunochemical methods have been developed for retrospective detection of exposure to sulfur mustard. Other agents are under consideration. Since the adducts of CW agents with macromolecules have life times of several days up to several months, the adducts of sulfur mustard can be detected over considerable time periods. In principle, immunochemical detection techniques of reaction products of CW agents with macromolecular constituents in the body of supposed victims, when developed, are simple to perform and can be applied under field conditions. These methods are also highly useful to monitor exposure to CW agents in persons involved in the destruction of stocks of such agents.

The methods are based on reaction products of sulfur mustard with DNA and proteins. The feasibility of the approach has been demonstrated using monoclonal antibodies raised against the major reaction product of sulfur mustard with DNA bases. With a competitive ELISA based on these antibodies we detect exposure of human blood to $\geq 2 \mu\text{M}$ sulfur mustard, whereas direct exposure of human skin to non-blistering Ct-values of sulfur mustard can be detected with immunofluorescent methods based on the same antibodies.