

# M.A.I.K

Mobile Acetylcholinesterase-Inhibitor Test-Kit



Portable test kit for the detection of nerve agents

## Nerve agents: mode of action

- Acetylcholinesterase is an enzyme playing an important role in nervous signal transmission
- Nerve agents bind to acetylcholinesterase (AChE) and thereby inhibit it
- The inhibition of AChE induces an overstimulation of the nervous system, which can finally lead to death by suffocation

## Detection of nerve agents

- The early detection of nerve agents is important in cases of chemical warfare casualties
- **Until now:** portable detection devices often fail to detect low-volatility liquids such as VX
- **M.A.I.K** overcomes this issue: it is a **mobile** and **generic** test based on the inhibition of **human** AChE. Therefore, **M.A.I.K** is **highly sensitive** to **all** human-toxic substances that inhibit AChE such as organophosphates or carbamates. For example, VX can be detected down to a small fraction of the human lethal dose (approx. 1:20,000)
- **M.A.I.K** can **easily** be used to detect a **surface contamination** (e.g. skin) with nerve agents and other AChE-inhibitors **within a few minutes**<sup>1</sup>



*Sampler for surface sampling*



*Yellow cap with human AChE*



*Sample tube with buffer solution*



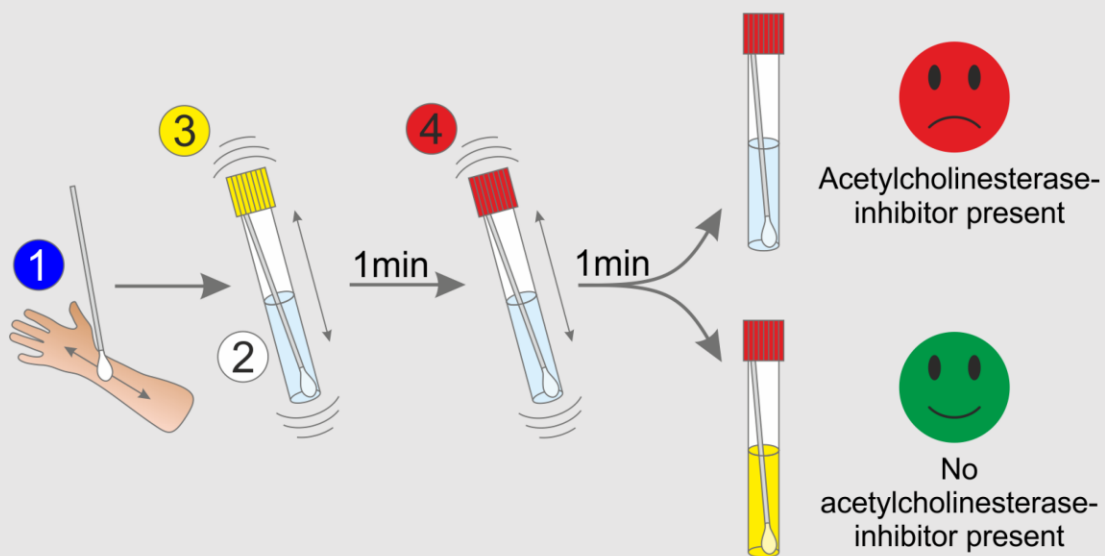
*Red cap with reagents*



All individual components are secured in a small aluminum bag. Due to the small dimensions and low weight, personnel can be equipped with multiple kits.

## Working principle of M.A.I.K

**M.A.I.K** uses a simple color reaction: a solution remains colorless, when an AChE-inhibitor is present. However, if no AChE-inhibitor is present, the solution turns yellow.



### Easy 4-step application

<b>1</b>	Wipe the surface area with the sampler	→	A potentially present AChE-inhibitor is adsorbed on the sampler
<b>2</b>	Put the sampler into the sample tube	→	The potentially adsorbed AChE-inhibitor is added to the solution
<b>3</b>	Screw the yellow enzyme cap onto the tube and shake the tube	→	Human AChE is added to the solution (and eventually inhibited by the inhibitor)
<b>4</b>	Screw the red reagent cap onto the tube and shake the tube again	→	Reagents are added and color reaction can start (if AChE is not inhibited)

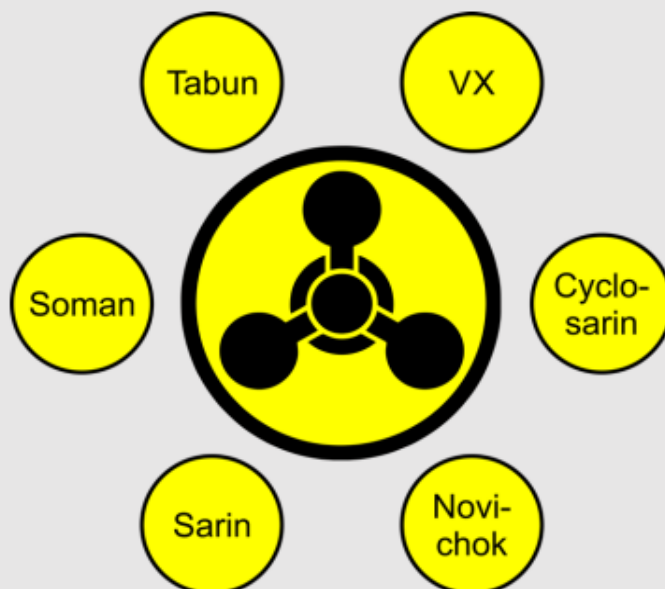
Use the color scale for result interpretation:

Colorless: AChE-inhibitor is present

Yellow: no AChE-inhibitor is present

# M.A.I.K – Summary

- ✓ Simple application
- ✓ Fast result within 3 minutes
- ✓ Mobile use
- ✓ Highly sensitive
- ✓ Broad detection spectrum



The rapid detection of skin contamination with **M.A.I.K** allows immediate countermeasures to be taken on site such as decontamination or initiation of therapy

For more information, please contact us!



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#### Sources:

1. Worek F, Wosar A, Baumann M, Thiermann H, Wille T. (Bundeswehr Institute of Pharmacology and Toxicology, Munich, Germany); *Development of a sensitive, generic and easy to use organophosphate skin disclosure kit*, Toxicol. Lett. 2017; 280:190-194.

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