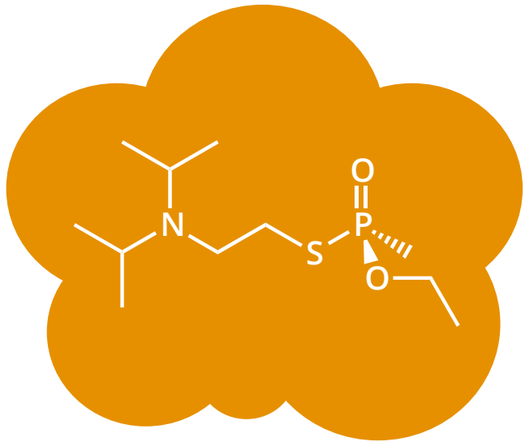
CHEMICAL WARFARE NERVE AGENTS

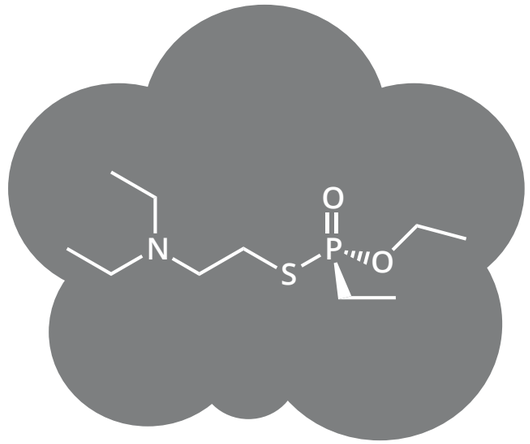
PART TWO: THE V SERIES

THE V SERIES NERVE AGENTS ARE HIGHLY TOXIC CHEMICAL WARFARE AGENTS. THE 'V' STANDS FOR 'VENOMOUS'. THEY WERE DISCOVERED IN THE UK IN THE 1950s, AND LATER VX WAS DEVELOPED FOR MILITARY USE BY THE UNITED STATES, THOUGH IT HAS NEVER BEEN USED IN WARFARE.



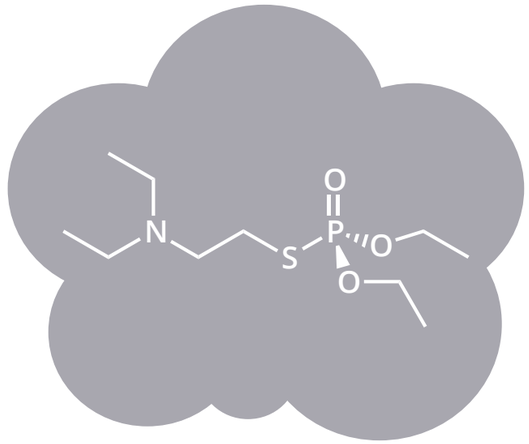
VX

(O-Ethyl-S-[2(diisopropylamino)ethyl] methylphosphonothioate)
(the compound known as 'Russian VX' is an isomer of this compound)



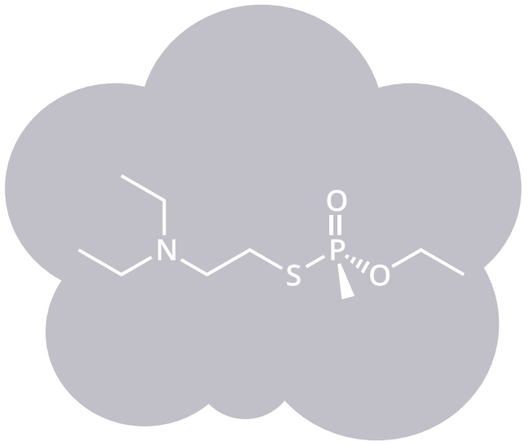
VE

O-Ethyl-S-[2-(diethylamino)ethyl] ethylphosphonothioate



VG

O,O-Diethyl-S-[2-(diethylamino)ethyl] phosphorothioate



VM

O-Ethyl-S-[2-(diethylamino)ethyl] methylphosphonothioate

SMELL & APPEARANCE

VX — Pure VX is a colourless liquid, but more commonly it is an amber-coloured, oily, odourless liquid.

VE, VG — The other V series nerve agents are thought to be odourless, colourless liquids at room temperature (when pure). As they have not been studied in detail outside of military investigations as to their usefulness in warfare, little more is known about them.

VM — Generally, their volatilities are low, though VX is the member of the series with the lowest volatility.

DISCOVERY

1952–1955
UNITED KINGDOM

The V series nerve agents were discovered during work to synthesise pesticides and insecticides. VG was originally sold as a insecticide, under the name 'Amiton'. It was marketed from 1954, but later withdrawn after the issues with human toxicity became apparent.

UK research on the compounds stopped in 1956, but was traded with the US in exchange for information on building thermonuclear devices.

USAGE & FATALITIES

As the V series agents exist primarily as low volatility liquids, they are designed for use as area-denial agents.

The only recorded human fatality as a result of VX is in Japan in 1994, when a sect used it to assassinate a former member. It may have also been used in Iraq by Saddam Hussein, though there is no conclusive evidence.

Sheep fared less well: Over 6000 were killed or injured in 1968 after a test in Utah, USA, with leftover VX leaking from a dispenser suggested as the likely accidental cause.

Production of VX was banned in the US in 1969. Its production and stockpiling was outlawed worldwide in 1993.

LETHALITY

FIGURES FOR VX

median lethal concentration
15
milligram-minutes per cubic metre

median lethal dose
10
milligrams per person (skin exposure)

Due to the scarcity of research on the V series nerve agents, data on lethality is only reliably available for VX. The other V series agents are thought to have roughly similar toxicities.

They have low volatilities - VX is around 2000 times less volatile than sarin - so the primary method of exposure is often through skin contact, rather than inhalation.

EFFECTS OF NERVE AGENTS

- ACh — Inhibit breakdown of acetylcholine
- Cause contraction of the pupils
- Excessive mucus, tears, saliva & sweat
- Nausea, gastrointestinal pain & vomiting
- Bronchoconstriction & chest tightness
- Spasms, convulsions & loss of bowel control
- Coma & eventual death

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