## Did VX kill Kim Jong-nam?

Our reporter 1 March 2017

Of the many unanswered questions surrounding the death of Kim Jong-nam, half-brother of North Korean leader Kim Jong-un, the claim by Malaysian authorities that he was killed by the banned nerve agent VX is the most perplexing. If true, it points the finger at the likely involvement of a government, its military and state agencies—in the first instance, but not solely, North Korea. If untrue, it raises even more questions about how Kim died.

VX, developed in the United States in the 1950s, is the most potent of a group of nerve agents that were manufactured as chemical weapons. It can be absorbed through the skin or by respiration, is stable and long lasting, as well as being highly toxic in very small quantities and rapidly acting. It kills by keeping muscles permanently contracted, leading to convulsions and stopped breathing.

VX is relatively simple, but extremely dangerous to manufacture. It was banned under the 1993 Chemical Weapons Convention. While a government source is the most likely, VX was made by the Japanese cult Aum Shinrikyo and used to attack three people in December 1994, one of whom died.

When Malaysia announced last week that Kim Jongnam had been killed by VX, chemical weapons experts quickly raised doubts about the claim.

Richard Guthrie, formerly of the Stockholm International Peace Research Institute, told *New Scientist*: "I have more questions than answers at this point. VX is the most toxic substance known—10 milligrams of the oily liquid on your skin, less than a drop, is lethal. But Kim took some time to show any symptoms, while the poison was handled by unprotected assailants, and didn't contaminate other people."

According to Malaysian police, two young women attacked Kim while he was waiting to board a flight to Macau at the crowded Kuala Lumpur international

airport. Both smeared a substance onto his face but were not wearing gloves or protective gear. They washed their hands before fleeing the scene. The police said last Friday that one of the women vomited repeatedly but suffered no other side effects.

Kim walked away from the scene to seek help and only then collapsed. He died on the way to hospital, after 15 to 20 minutes. No one else has been reported as showing any symptoms of VX poisoning. The airport was not sealed off or checked for the poison for more than a week.

The Malaysian authorities conducted two autopsies—the second after the first failed to conclusively identify a cause of death—before announcing well over a week after the murder that VX was the poison involved.

Writing in the *Spectator*, Dr Roger Henderson also questioned why Kim did not immediately exhibit the symptoms of VX poisoning. "If exposed to VX, symptoms typically start within 30 seconds, with the usual pattern being chest tightness and coughing, blurring of vision, shortness of breath and headache. The nervous system then rapidly shuts down, causing seizures, collapse and death within minutes."

Henderson speculated that it was possible that North Korean supplies of VX were old and degraded and therefore not as effective. He noted: "The Iraqi supply of VX discovered by UN inspectors after the first Gulf war was found to have degraded rapidly over a short period of time."

There are other questions. If the two women applied the poison to Kim with their bare hands, why didn't they die? Two answers have been suggested. There is no evidence to date that either method was actually used.

The first explanation is that the women could have been administered a high dose of the drug atropine, which acts as an antidote to VX, prior to the attack. The second is that VX could have been in binary form—that is, two relatively safe chemicals that when mixed produce the potent poison. Each of the women might have applied one of the chemicals to Kim's face. The woman applying the second, however, risked exposure to VX, which might account for the reports of vomiting.

The *New Scientist* article cited above and entitled "Was Kim Jong-nam killed by VX nerve gas? Doesn't look like it" raised a further question:

"The attackers might have been pre-treated with atropine, a drug that blocks the effects of VX. But the medical staff who handled Kim in the ambulance where he later died—with convulsions, which is consistent with VX but also other poisons—would not have been pre-treated.

"They should have been contaminated, which is common in incidents involving such chemicals, but are not known to have reported any VX symptoms. The chemical might have been enclosed in capsules that only released VX after being smeared on Kim's face—but again medics should have been affected."

Speaking to the Associated Press, John Trestrail, an American forensic toxicologist, questioned why other people were not affected by the poison and the airport not cordoned off. "It's as persistent as motor oil. It's going to stay there for a long time. A long time, which means anyone coming into contact could be intoxicated from it. If this truly is VX, they ought to be calling a hazmat team and looking at any place these women or the victim travelled after the exposure."

Chemical weapons expert Jean-Pascal Zanders was among those who called on the Malaysian authorities to get a second opinion from the Hague-based Organisation for the Prohibition of Chemical Weapons (OPCW). She told the *New Scientist* that Kim's body should be sent to an OPCW-certified laboratory and pointed out there was one in neighbouring Singapore.

The OPCW itself declared that the alleged use of VX was "deeply disturbing" and offered its expertise and technical assistance to Malaysia.

Yesterday, Malaysia's Deputy Prime Minister Ahmad Zahid Hamidi declared that the country would share its information with international bodies and outside parties, but that would only be possible "after the police have completed their probe and the court has decided on the case." In other words, it would be weeks and months away, if not longer.



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