

Sarin

What is sarin?

Sarin is a man-made chemical warfare agent classified as a nerve agent. It is also known as GB. Nerve agents are the most toxic and rapidly acting of the known chemical warfare agents. They are similar to certain kinds of insecticides called organophosphate insecticides in terms of how they work and what kind of harmful effects they cause; however, nerve agents are much more potent than insecticides. Sarin was originally developed in 1938 in Germany as an insecticide.

What does sarin look like?

Sarin is a clear, colorless, and tasteless liquid that has no odor in its pure form. However, sarin can evaporate into a vapor (gas) and spread into the community.

Where is sarin found and how is it used?

Sarin is not found naturally in the environment. Sarin and other nerve agents may have been used in chemical warfare during the Iran-Iraq War in the 1980s. Sarin was used in two terrorist attacks in Japan in 1994 and 1995.

How might I be exposed to sarin?

If sarin is released into the air, people may be exposed through skin contact or eye contact. They may also be exposed by breathing air that contains sarin. If sarin is released into water, people may be exposed by touching or drinking water that contains sarin. If sarin comes in contact with food, people may be exposed by eating the contaminated food. A person's clothing can release sarin for about 30 minutes after it has come in contact with sarin vapor. Other people can be exposed to sarin if they breathe this sarin gas. Because sarin breaks down slowly in the body, people who are repeatedly exposed to sarin may suffer more harmful health effects.

How does sarin work?

The extent of poisoning that sarin causes depends on three factors: (1) the amount of sarin to which someone is exposed, (2) how the person was exposed, and (3) how long the exposure lasted. Symptoms will appear within a few seconds after exposure to the vapor form of sarin and within a few minutes up to 18 hours after exposure to the liquid form. All the nerve agents cause their toxic effects by preventing the proper operation of the chemical that acts as the body's "off switch" for glands and muscles. Without an "off switch" the glands and muscles are constantly being stimulated. They may tire and no longer be able to sustain breathing function. Sarin vapor is heavier than air, so it would be more likely to settle in low-lying areas. Because sarin mixes easily with water, water can easily be contaminated. Sarin is the most volatile of the nerve agents, which means that it can easily and quickly evaporate from a liquid into a vapor and spread into the environment. People can be exposed to the vapor even if they do not come in contact with the liquid form of sarin. Because it evaporates so quickly, sarin presents an immediate, but short-lived, threat.

What are the signs and symptoms of sarin exposure?

People may not know that they were exposed because sarin has no odor. People exposed to a low or moderate dose of sarin by breathing contaminated air, eating contaminated food, drinking contaminated water, or touching contaminated surfaces may experience some or all of the following symptoms within seconds to hours of exposure: runny nose, watery eyes, small pinpoint pupils, eye pain, blurred vision, drooling and excessive sweating, cough, chest tightness, rapid breathing, diarrhea, increased urination, confusion, drowsiness, weakness, headache, nausea, vomiting, and/or abdominal pain, slow or fast heart rate,

low or high blood pressure. Even a small drop of sarin on the skin can cause sweating and muscle twitching where sarin touched the skin. Exposure to large doses of sarin by any route may result in loss of consciousness, convulsions, paralysis, and respiratory failure possibly leading to death.

Are there any long-term health effects?

Mild or moderately exposed people usually recover completely. Some studies in animals and people suggest that severe nerve agent poisoning can cause long-term central nervous system effects, such as changes in brain activity. However, it is unclear what such changes may mean, if anything, regarding the function and long-term health status of a person who has been mildly or moderately exposed to sarin.

How is sarin exposure treated?

Sarin poisoning is treated with antidotes, if necessary, and with supportive medical care. The most important thing is for victims to be rapidly decontaminated and to be given medical treatment as soon as possible.

How can I protect myself and what do I do if I am exposed to sarin?

Recovery from sarin exposure is possible with treatment, but the antidotes available must be used quickly to be effective. Therefore, the best thing to do is avoid exposure. If exposure cannot be avoided, rapidly decontaminate and get medical care as quickly as possible by taking the following actions.

- * Leave the area where the sarin was released and get to fresh air. Quickly moving to an area where fresh air is available is highly effective in reducing the possibility of death from exposure to sarin vapors.
- * If the sarin release was outdoors, move away from the area where the sarin was released. Go to the highest ground

possible because sarin is heavier than air and will sink to low-lying areas.

- * If the sarin release was indoors, get out of the building. Remove any clothing that has liquid sarin on it, and if possible seal the clothing in a plastic bag. Then seal the first plastic bag in a second plastic bag. Removing and sealing the clothing in this way will protect you and others from any chemicals that might be on your clothes.
- * If helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.
- * Rinse the eyes with plain water for 10 to 15 minutes if they are burning or if vision is blurry.
- * As quickly as possible, wash any liquid sarin from the skin with large amounts of soap and water. Washing with soap and water will protect people from any chemicals on their bodies.
- * If sarin has been swallowed, do not induce vomiting or give fluids to drink. Seek medical attention immediately. Stay calm. Dial 911 and explain what has happened. Wait for emergency personnel to arrive.

Where can I get more information on sarin?

Contact the regional poison control center (1-800-222-1222), the Centers for Disease Control and Prevention Public Response Hotline (CDC) English (888) 246-2675, Español (888) 246-2857, TTY (866) 874-2646, or the Agency for Toxic Substances and Disease Registry (ATSDR) (1-888-422-8737).

Questions and comments about sarin are welcomed and may be addressed to the Bureau of Emergency Preparedness and Response by calling 603-271-4496 or 800-852-3345 x4496. For further information, refer to the Centers for Disease Control and Prevention website at www.cdc.gov or at the New Hampshire Department of Health and Humans Services website at www.dhhs.state.nh.us.