Nerve agents

Military designations: GA, GB, GD, GF and VX

Common names: Tabun (GA); sarin (GB); soman (GD). No common names for GF and VX.

Description: Pure sarin (GB) and the other G-series nerve agents are colorless, odorless and tasteless as liquids and vapor. Developed in Germany in 1938 as a pesticide, sarin is named for its creators, Shrader, Ambros, Rudriger and van der Linde. VX is an odorless and tasteless oily liquid developed in the United Kingdom in the early 1950s. The amber liquid evaporates slowly with a consistency similar to motor oil. The least volatile of the nerve agents, VX is also the most potent. As vapor, these agents are heavier than air and sink to low lying areas near the ground.

Non-military uses: There is no known commercial use for nerve agents.

Military uses: German scientists first developed nerve agents in the 1930s for use as pesticides. By World War II, the Germans possessed nerve agent-filled rounds but did not use them against the Allies. In the early 1950s, the North Atlantic Trade Organization (NATO) adopted GB as a standard chemical warfare agent and both the United States and USSR developed nerve agents for military purposes. The Iraqi government employed nerve agent against Iran in the 1980-1988 war, and Iraq was known to possess nerve agents through the early 1990s. Most recently the Japanese religious sect Aum Shinrikyo committed terrorist attacks on civilians using GB in 1994 and again in 1995 on the Tokyo subway.

Health effects: Nerve agents are man-made, fast-acting, lethal, organophosphate compounds similar to insecticides. They affect the body by inhibiting or deactivating cholinesterase, an enzyme found throughout the body. When cholinesterase is inhibited, muscular and glandular hyperactivity occurs. Exposure to nerve agents can occur through inhalation, ingestion, eyes, skin and mucous membranes. They attack the nervous system causing glands to over-secrete, creating a buildup of fluid in the lungs and causing the muscles to convulse uncontrollably. Symptoms may appear immediately or within minutes or hours depending on the dose and route taken by the agent. Symptoms may include blurred vision and watery eyes, headache, runny nose, salivation, foaming at the mouth, tightness of chest, nausea, vomiting, extreme anxiety, difficulty in thinking and sleeping, muscle spasms, tremors, abdominal cramps, diarrhea and involuntary urination and defecation. Exposure to relatively large doses will result in loss of consciousness, convulsions, paralysis and respiratory failure resulting in death.

Environmental fate: GB will react with water to produce toxic vapors. Because of its rapid hydrolysis, GB mixed with water is not considered a long-term water contaminant. Most spilled GB evaporates quickly, thereby eliminating its long-term environmental impact. VX is moderately persistent in soil and, because it has low water solubility, could be mobile in surface and ground water systems. Open-pit burning or burying of nerve agent is prohibited.

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