Nerve Agent Antidote Kit

Tech ID: 22248 / UC Case 2012-172-0

SUMMARY

BACKGROUND

Nerve agents (organophosphorous compounds) are chemical poisons that are classified as weapons of mass destruction by the United Nations. Exposure to even minute levels of invisible, vaporized nerve agents can lead to convulsions, involuntary loss of major bodily functions, and death by asphyxiation. Because of the ease with which they are synthesized, concealed, and their potential for mass casualties, nerve agents are among the most serious terrorist threat today. The antidote kits Mark I (atropine and palidoxime) and CANA (diazepam) can prevent or reduce nerve agent-induced seizures if delivered within minutes of exposure. However, once seizures commence, they quickly become resistant to such treatments. Therefore, more effective antidotes are desirable for the protection of soldiers as well as for emergency planning in urban settings. A more potent antidote cocktail will reduce casualties and attenuate brain injuries resulting from a nerve agent attack. Moreover, acute seizures and Status Epilepticus that may be induced by a variety of ailments cause complications through similar mechanisms as nerve agents. Therefore, these patients may benefit from a polytherapy designed to rapidly reduce seizure initiation and severity.

INNOVATION

Researchers from the Epilepsy Research Laboratory at the VA of Greater Los Angeles and the Brain Research Institute at UCLA have discovered unique multi-drug therapies that are considerably more effective at reducing seizures than diazepam monotherapy. Two combinations of three drugs displayed an enhanced ability to reduce seizure quantity and severity in a surrogate animal model of nerve agent exposure. Importantly, the dosing of the multi-drug antidotes also reduced toxicity in animals compared to diazepam monotherapy.

APPLICATIONS

- Treatment after exposure to nerve agent weapons (e.g. sarin, soman, VX, tabun).
- Treatment for acute seizures and status epilepticus.

ADVANTAGES

- Unlike Mark I or CANA antidotes, the combination, the multi-drug therapy described here can stop seizures even after an extended 30 minute delay.
- Reduced toxicity from the multi-drug therapy reduces the risk of adverse effects.
- The combination therapy maintains a greater freedom of movement in animal models.

STATE OF DEVELOPMENT

In a surrogate animal model of nerve agent exposure, the VA and UCLA researchers have found that two triple therapy combinations are more efficient than diazepam monotherapy to block seizures. The study uncovered a high level of synergy in the seizure reducing activity of all the drug combinations.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,814,729	11/14/2017	2012-172

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OTHER INFORMATION

KEYWORDS

Nerve agents, sarin, soman, epilepsy, seizures, status epilepticus, chemical warfare, terrorism

CATEGORIZED AS

- **Medical**
  - Disease: Central Nervous System
  - Therapeutics

RELATED CASES

2012-172-0

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