Toward a better cyanide antidote for terrorist attacks and other mass casualty events

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In an advance toward closing a major gap in defenses against terrorist attacks and other mass casualty events, scientists are reporting discovery of a promising substance that could be the basis for development of a better antidote for cyanide poisoning. Their report, which describes a potential antidote that could be self-administered, much like the medication delivered by allergy injection pens, appears in ACS' *Journal of Medicinal Chemistry*.

Steven E. Patterson, Ph.D., and colleagues at the University of Minnesota Center for Drug Design explain that the only existing antidotes for cyanide—recognized as a high-risk substance for potential use by terrorists—must be administered by intravenous infusion. That procedure requires highly trained paramedical personnel and takes time. Cyanide, however, is a fast-acting poison. In a situation involving mass casualties, only a limited number of victims could be saved. Patterson's team thus sought an antidote that could be administered by intra-muscular (IM) injection, a simpler procedure that could be administered rapidly to a large number of victims or even be self-administered.

Their report describes discovery of a substance, sulfanegen TEA, "which should be amenable for development as an IM injectable antidote suitable for treatment of cyanide victims in a mass casualty setting. Further development, including efficacy in lethal cyanide animal models, will be reported at a later date."

More information: "Cyanide Antidotes for Mass Casualties: Water-

Soluble Salts of the Dithiane (Sulfanegen) from 3- Mercaptopyruvate for Intramuscular Administration", *J. Med. Chem.*, Just Accepted Manuscript, DOI: 10.1021/jm301633x

Abstract

Current cyanide antidotes are all administered by IV infusion, a suboptimal procedure in a mass casualty setting. Therefore, in a cyanide disaster from a chemical accident or an act of terrorism, intramuscular (IM) injectable antidotes would be more appropriate. It has become clear that our lead cyanide antidote, viz., sulfanegen sodium, is insufficiently water-soluble for the IM mode of administration. We now report the discovery of the highly water-soluble sulfanegen triethanolamine salt, with greater than a 4-fold increase in solubility and increase in potency compared to the parent sulfanegen sodium, thus offering a promising lead for development as an IM injectable cyanide antidote.