Cyanide, Sulfide, Methane-Thiol Antidote

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BACKGROUND

Cyanide is a highly toxic agent that inhibits mitochondrial cytochrome-c oxidase, thereby depleting cellular ATP. Cyanide exposure contributes to smoke inhalation deaths in fires and could be used as a weapon of mass destruction. Cobalamin (vitamin B12) binds cyanide with a relatively high affinity and is used to treat smoke inhalation victims. Cobinamide, the penultimate compound in cobalamin biosynthesis, binds cyanide with about 10^{10} greater affinity than cobalamin and is 5-10 times more potent than cobalamin in rescuing animals from cyanide poisoning. Cobinamide is also an effective intra- and extracellular nitric oxide scavenger.
Currently, three cyanide antidotes are currently available in the United States: nitrites, thiosulfate, and hydroxocobalamin. All three drugs are approved only for intravenous (IV) administration, and thus are not suitable for treating mass casualties as could occur after a major industrial accident or a terrorist attack. Thus, new formulations for cyanide exposure treatment that are faster and easier to administer are needed.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed methods for treating cyanide, sulfide, and methane thiol exposure in a patient. More specifically, the present invention relates to methods of neutralizing cyanide, sulfide, and methane thiol in a patient caused by exposure to such compounds. The present invention also provides pharmaceutical compositions.

APPLICATIONS

It can be used to treat cyanide, sulfide, and methane thiol poisoning in humans. Cyanide poisoning is a common occurrence in people exposed to smoke from residential and industrial fires.

ADVANTAGES

It has a high therapeutic index and is much safer in animals than current derivatives in use.

STATE OF DEVELOPMENT

In mouse studies, it was well absorbed after intramuscular injection and it rescued mice from cyanide, hydrogen sulfide, and methane thiol poisoning, and it was very well tolerated in these animals. A large number of animal studies have been conducted in pigs and rabbits, but we are still in the experimental data stage generating additional safety and efficacy data in animals and stability in vitro.

INTELLECTUAL PROPERTY INFO

This technology is patent pending and available for licensing and/or research sponsorship.

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	2019/236552	12/12/2019	2018-154

CONTACT

University of California, San Diego
Office of Innovation and Commercialization
innovation@ucsd.edu
tel: 858.534.5815.

OTHER INFORMATION

KEYWORDS

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Antidote, poisoning, smoke inhalation,

nitric oxide scavenger.

CATEGORIZED AS

- Materials & Chemicals
  - Biological
- Medical
  - Other
- Agriculture & Animal Science
  - Chemicals

RELATED CASES

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