Water-Soluble Iron-Porphyrin Complexes Capable Of Acting As Antidotes For Carbon Monoxide Poisoning

Tech ID: 32811 / UC Case 2021-932-0

BACKGROUND

CO poisoning is the most common form of poisoning worldwide. In the United States alone, over 50,000 emergency department visits each year are attributed to CO exposure. Despite the prevalence of CO poisoning, there is no clinically-approved antidote available.

Current best practices involve placing the afflicted subject in fresh air, delivering 100% O2, or administering superatmospheric levels of O2 in a hyperbaric chamber. These treatments all serve to clear CO from the body by displacing it from metalloproteins with O2. The typical half-life of COHb in the bloodstream is 5.3 h, but hyperbaric O2 (1.5-3 atm) can decrease this half-life to < 1 h.

Unfortunately, these large chambers are generally located in tertiary care centers to which patients must be transported. Moreover, hospitals typically house only a few such chambers, which would be rapidly overwhelmed in the event of a mass exposure.

Although there are no clinically approved antidotes to CO poisoning, two strategies have been described: the creation of molecules that enhance the rate of release of CO from carboxyhemoglobin (formed during CO poisoning) and the creation of molecules that bind CO more strongly than physiologically important proteins such as hemoglobin.

TECHNOLOGY DESCRIPTION

These compounds are the first small molecule frameworks designed to bind CO at a higher affinity than physiologically important proteins and are therefore more readily scaled up and produced at high purity.

An example structure is illustrated here:

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OTHER INFORMATION

KEYWORDS

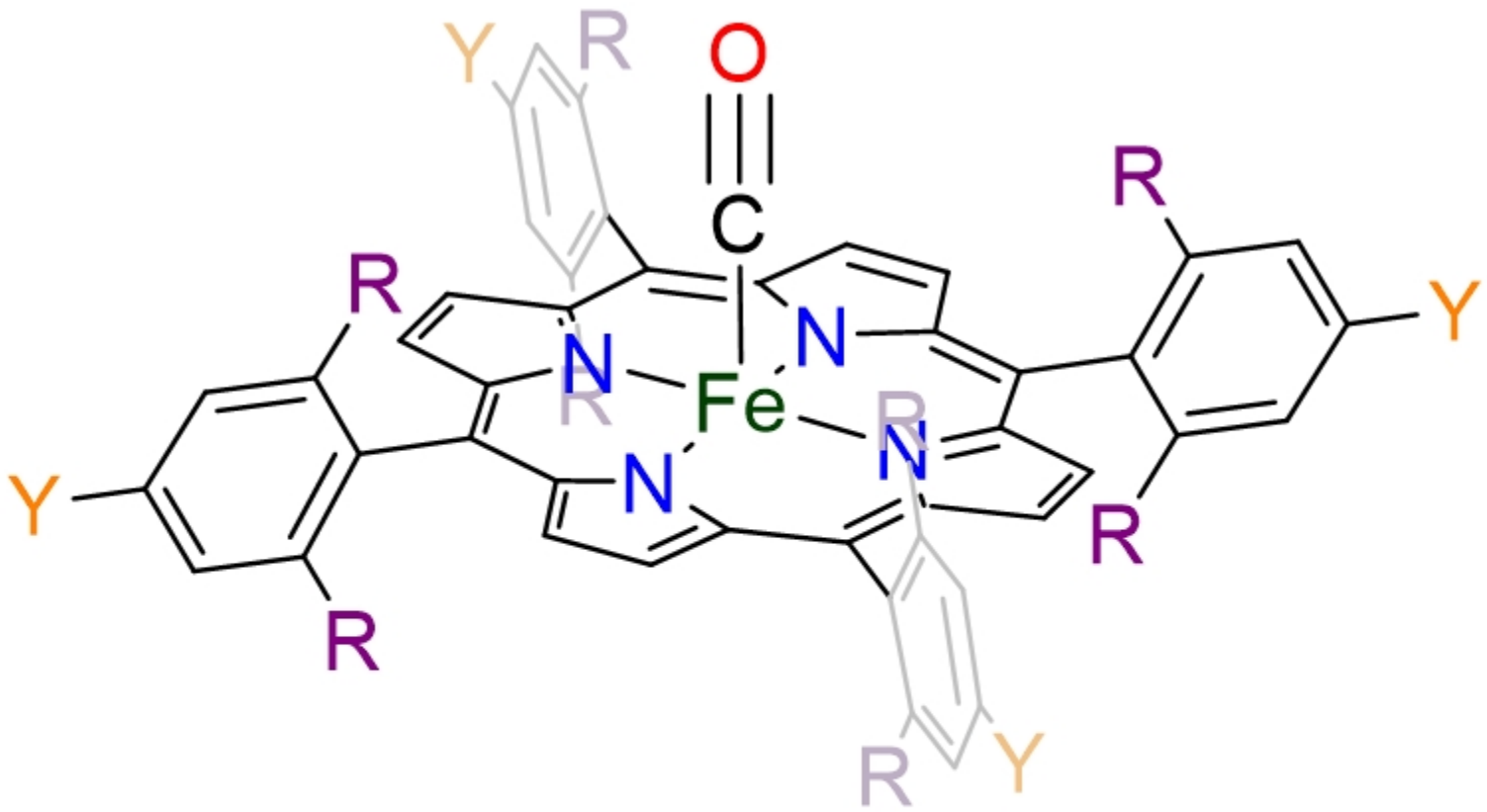
carbon monoxide poisoning, small molecule therapeutics, emergency therapeutics, antidote

CATEGORIZED AS

- **Medical**
  - Disease: Blood and Lymphatic System
  - Disease: Cardiovascular and Circulatory System
  - Therapeutics

RELATED CASES

2021-932-0



Y = Solubilizing ionic group

R = Sterically bulky group

APPLICATIONS

- Antidote for carbon monoxide poisoning

ADVANTAGES

- Small molecule
- Water soluble
- Can be delivered to patients in emergency settings
- Can work in mass exposure events

INTELLECTUAL PROPERTY INFORMATION

Country	Type	Number	Dated	Case
European Patent Office	Published Application	4395773	07/10/2024	2021-932

Additional Patent Pending

RELATED MATERIALS

- A water-soluble iron-porphyrin complex capable of rescuing CO-poisoned red blood cells - 01/28/2022

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