



Treating Iron Overload with Block Copolymers

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WARF: P140395US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing new block copolymers for forming micelles that can chelate iron (II) and (III) ions before clearing from the body.

Overview

Iron overload or hemochromatosis is a disease marked by an accumulation of iron in the blood. It typically occurs in subjects (e.g., anemia patients) receiving chronic infusions of red blood cells. The disease is estimated to afflict up to six percent of people in the United States, and can cause tissue damage or organ failure if not properly treated.

The most common drug for treating iron overload via the intravenous route is deferoxamine, which can chelate to both the Fe^{2+} and Fe^{3+} ions. Unfortunately the drug suffers from a poor half-life and dangerous side effects. Two more recent drugs, deferasirox and deferiprone, are more bioavailable as oral formulations but for reasons not well understood, they each preferentially bind to only one form of the ion and are currently being investigated in combination with each other or with deferoxamine to improve therapeutic efficacy.

The Invention

UW–Madison researchers have developed new block copolymers for forming micelles that can respond to the oxidation state of their environment and chelate iron (II) and (III) ions. At suitable concentrations the copolymers can form micelles to prolong circulation in the blood and bind to non-transferrin bound iron. The micelles then break up in cells in the presence of oxidizing agents such as hydrogen peroxide and are cleared from the body by the liver or kidney route.

The copolymers include a polyhydroxamic acid-containing block and a polyferrocenyl block. They can be prepared by standard peptide synthesis or polymerization methods.

Applications

- New therapeutics for treating iron overload

Key Benefits

- Large molecular structure offers improved pharmacokinetics.
- Longer half-life
- Efficient iron removal
- Prepared by standard methods
- Flexibly administered (oral, rectal or parenteral)

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Stage of Development

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The researchers have prepared the micelles and demonstrated their effectiveness to chelate iron.

Additional Information

Related Technologies

- [WARF reference number P120356US01 describes a method to detect iron overload using MRI.](#)

Tech Fields

- [Therapeutics & Vaccines : Oncology.](#)

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847

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