TECHNOLOGY

Molecular Container to Enhance Solubility of Drugs

OVERVIEW

Background

One of the key obstacles encountered by the pharmaceutical industry is the deficient bioavailability of drugs due to poor aqueous solubility. One approach to address this problem is the development of molecular containers that encapsulate and thereby solubilize otherwise insoluble drugs in an aqueous environment. Ideally, such molecular container-drug complexes can be delivered in a targeted manner in the human body. Accordingly, water soluble molecular containers are highly desirable toward the formulation of a wide array of pharmaceutical drugs and agents. Currently, the most commonly used class of water soluble molecular containers for drug delivery applications are the cyclodextrins. Cyclodextrins however, have their drawbacks and cannot be considered as a universal container for all possible drugs. Therefore a great need exists for the invention of new classes of molecular containers that will provide an alternative to cyclodextrins as solubility enhancers and delivery agents.

Innovative Technology

Researchers at the University of Maryland have discovered a new cucurbit[n]uril-type molecular container that binds to a variety of FDA approved agents in water. For example the new CB[n]-type container binds to Rocuronium which is a widely used anesthetic during surgery. By sequestering Rocuronium post-operatively by the application of the new CB[n]-type container, the recovery time of the patient is decreased. The excellent aqueous solubility (100 mM) of this new CB[n]-type container makes it ideal for intravenous administration. The new CB[n]-type container has also been successfully tested for enhancing the aqueous solubility of a multitude of FDA approved pharmaceuticals including anti-cancer, anti-arrhythmic, anti-clotting and anti-histamine drugs and agents. Toxicity studies in human cell lines establish that the new CB[n]-type container is bio-compatible (e.g. non-toxic). A scalable, efficient, and cost effective synthetic route to this compound has also been developed by the same researchers.

Advantages
- Highly water soluble
- Containers can be produced in scalable quantities at minimal cost
- Promising results from toxicity tests on human cell lines

Applications
- Reversal agent for rocuronium following surgery
- Solubility Enhancement for a variety of pharmaceutical agents and drugs

Stage of Development
- The container is being used in current work

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Drug delivery devices

EXTERNAL RESOURCES

- US Patent 9,567,344

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