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Chitosan Derivative for Endotoxin Inactivation

A novel chitosan-derived treatment effectively inactivates bacterial endotoxins for improved sepsis therapy and contaminant removal in water purification.

Septicemia refers to the presence of pathogens in the bloodstream that leads to sepsis, a potentially life-threatening medical condition characterized by whole-body inflammation and the presence of infection. When microbes infect the blood, skin, lungs or other tissues, the body's immune system generates an inflammatory response in an attempt to fight the infection. The body's immune response to the infection causes the characteristic symptoms of sepsis and can lead to organ failure. The current treatment for sepsis requires antibiotics, fluid drainage, blood transfusions, and dialysis. Since individual cases are caused by different microbes, the correct antibiotic must be chosen to treat the infection. This causes a delay in treatment, which leads to an increase in the mortality rate.

Purdue University researchers have developed a novel treatment for septicemia involving molecules derived from chitosan. Chitosan is a linear carbohydrate with many commercial and biomedical uses. This treatment inactivates endotoxins, which are toxins associated with certain types of bacteria and stimulates cytokine release (part of the body's inflammatory response that causes swelling and high fever). This new chitosan shows many advantages over current IV treatments for septicemia. This technology can be used to filter endotoxins out of plasmid DNA samples and filter bacteria from water, making contaminated water samples safe to drink.

Advantages:

-Stronger affinity for inactivating endotoxins

-Excellent biocompatibility upon injection

-Lower potential to cause hemolysis, complement activation, and inflammatory responses

Technology ID

65894

Category

Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

Pharmaceuticals/Small Molecule Therapeutics

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Potential Applications:

-Medical/Health

-Sepsis treatment

-Contaminant removal from drinking water

Related Publications:

Yoon Yeo, et al. Zwitterionic chitosan for the systemic treatment of sepsis. Scientific Reports 6, Article number: 29739 (2016). doi:10.1038/srep29739

https://www.nature.com/articles/srep29739

TRL: 3

Intellectual Property:

Provisional-Patent, 2011-09-27, United States | Utility Patent, 2012-09-27, United States | CON-Patent, 2016-07-18, United States | CIP-Patent, 2016-11-08, United States

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