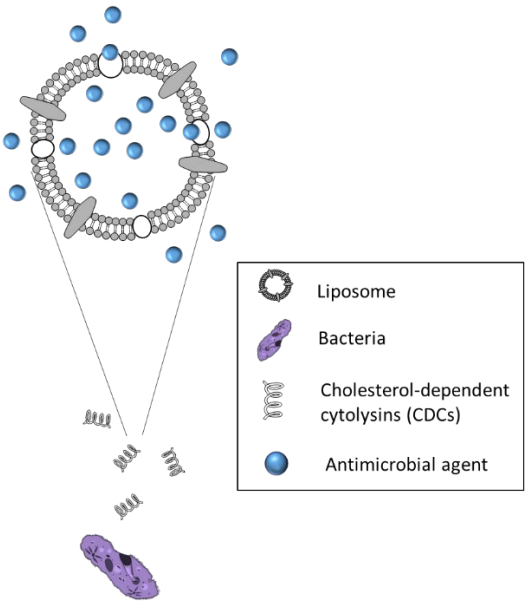
UNIVERSITY OF WATERLOO

TECHNOLOGY SUMMARY



Reference
10231

Patent status
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Stage of development
Prototype with ongoing research

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Bacteria-responsive drug release platform for food packaging

Background

Currently, 17% of the total global food production is wasted which is due in part to the short shelf-life of food products. Preservatives are used to prevent spoilage, improve appearance, and maintain the food's nutritional quality; however, preservatives only prolong food shelf life and do not eliminate bacteria. By the time bacteria growth is detected it is too late, and the entire food product must be discarded. Furthermore, certain preservatives may have unwanted side effects. Designing better and smarter food packaging can help prolong the shelf-life and help dramatically reduce food spoilage and promote food sustainability.

Description of the invention

This invention relates to a novel smart bacteria-responsive platform that will only release antimicrobial agents (preferably naturally derived) in the presence of specific bacteria. Common bacteria involved in food poisoning include bacillus, clostridium, listeria, and streptococcus. These bacteria produce a class of virulent factors called cholesterol-dependent cytolysins (CDCs).

Waterloo researchers have developed a nanotechnology-based formulation (liposome) that achieved sustained drug release over a 5-day period only in response to specific bacteria that produce CDCs. No drug is released in the absence of these bacteria. This is the first known on-demand bacteria-responsive technology platform.

Advantages

The platform shows high specificity of drug release to bacteria that produce CDCs which can be used to prolong the shelf-life of food products. This can reduce the use of food preservatives which may have unwanted side effects and will eliminate the bacteria responsible for food spoilage when or if it is present. This will reduce the exposure of unwanted chemicals while prolonging the shelf-life of food products.

Potential applications

- Surface coating on food packaging
- Could be extended to other systems that require the release of antimicrobial agents when certain bacteria are present:
    - High-contact surfaces such as countertops
    - Curtains/drapes
    - Medical equipment