

WHEN 2+2=5

THE BREAKTHROUGH OF USING LIPID-POLYMER HYBRID NANOPARTICLES AS ANTI-INFECTIVE DELIVERY SYSTEMS

LEARN THE FACTS


10 m deaths by 2050 for antimicrobial resistant infections


1 out of 3 people in England takes at least 1 course of antibiotic per year


12'000 deaths per year in UK

£180'000'000 spent by NHS per year to treat resistant infections

Zero classes of antibiotics discovered since 1980s

 Chitosan is a natural and **antimicrobial** polymer derived from shrimps

 Antibiotics can be loaded inside nanoparticles, which can function as a **carrier** to bring antibiotics to the heart of the infection

 Nanoparticles can **protect** antibiotics from being destroyed inside the body

Liposomes are lipid-based **vesicles**

By using lipids similar to those of bacterial membrane it is possible to manufacture **biomimetic liposomes**, which are able to fuse with bacterial membrane

Biomimetic liposomes can be surface adsorbed with novel **antimicrobial peptides**

Chitosan Nanoparticles

LIPID-POLYMER HYBRID NANOPARTICLES

Biomimetic Liposomes

Lipid-polymer hybrid nanoparticles

are considered a promising strategy to overcome antibiotic resistance challenge

Polymeric core surrounded by a **membrane-like lipid shell**

Combinations of advantages provided by chitosan nanoparticles and biomimetic liposomes

Possibility to deliver **traditional antibiotics** together with novel **antimicrobial peptides**

Proved **synergistic activity** of antibiotics and antimicrobial peptides

Take home message

Delivery systems such as lipid-polymer hybrid nanoparticles may provide a means to breathe new life into old antibiotics