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Delivery of antimicrobials to bacteria by cubosome nanocarriers

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The increasing prevalence of antibiotic resistant bacteria, in part due to overuse and misuse of antibiotics over the past decades, is one of the key global health challenges. Some gram-negative strains have already been found to be resistant even to last resort antibiotics. This is partially due to their ability to hinder the transport of antimicrobials through their outer membrane structure. One proposed strategy to combat this issue is via the use of lipid nanocarriers as drug delivery vehicles. These nanocarriers are known to interact with the outer lipid membrane via a unique fusion-type mechanism which can improve transport of antimicrobials into Gram-negative bacteria (Figure 1). In this talk I will discuss the mechanism of interaction of cubosome lipid nanocarriers with both Gram-positive and Gram-negative bacteria and discuss recent advances in the use of lipid-based nanocarriers to deliver antibiotics.

Synchrotron SAXS is used to characterise the internal nanostructure of the particles before and after encapsulation of a range of antimicrobials including metal nanocrystals,[1] antimicrobial peptides [2] and small molecule drugs.[3] Synchrotron CD is used to confirm retention of secondary structure following encapsulation for antimicrobial peptides.[2] The mechanism of uptake of cubosomes into both Gram-positive and Gram-negative bacteria is demonstrated using TIRF microscopy in combination with synchrotron FTIR.[3.4] Fundamental differences in the uptake mechanism between Gram-positive and Gram-negative bacteria will be described.[3]

(more)

Presenter Gender

Woman

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

Students Only - Are you interested in AINSE student funding

Level of Expertise

Expert

Pronouns

Which facility did you use for your research

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