Developing self-assembling cyclodextrins to tackle the cytopathic activity of SARS-CoV-2

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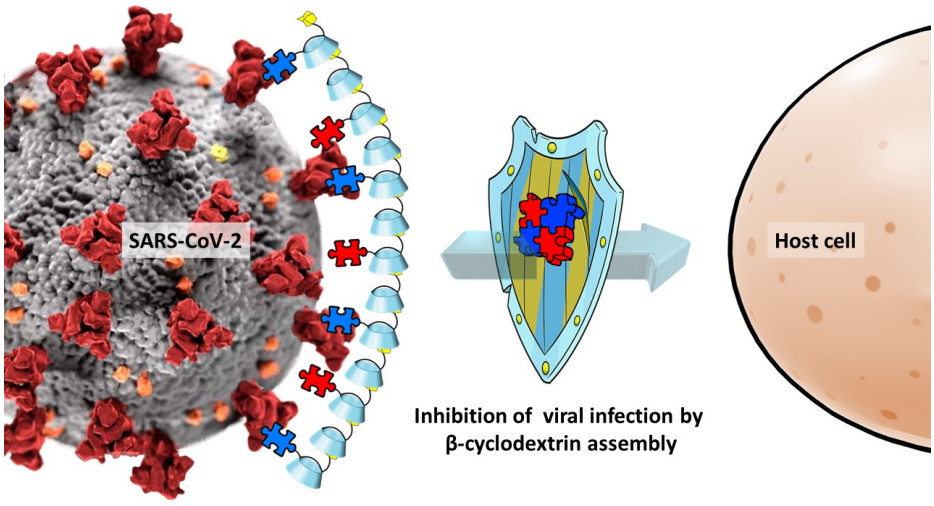
The global pandemic caused by SARS-CoV-2 has arisen awareness about the importance of the development of rapid tools to fight the transmission of viruses. However, there is still a lack of over-the-counter products to be used by the public as preventive systems against covid-19. Efforts have been made to inhibit the infection by the virus targeting the SARS-CoV-2 spike protein and its affinity for different ligands including carbohydrates[1] and peptides.[2] To target the different binding domains of the spike protein, a library of ligands comprising sialic acids with various linkages and substitutions, heparan sulphate mimics, peptides and small molecule protein-protein interactions inhibitors has been synthesised. However, the multivalency of the spike protein needs to be addressed for the design of viral infection inhibitors. Cyclodextrin-adamantane conjugates have been proved useful in the past years to generate thermodynamically self-assembling systems.[3] Furthermore, it was found that the co-assembly was favoured in the presence of a molecular template such as DNA to form fibres.[4] To investigate whether the surface receptors of a pathogen can function as a biological template for the self-assembly of our cyclodextrin-based system, a library of ligands will be applied to study the cytopathic effect inhibition of SARS-CoV-2 to protect cells. These results will inform the development of novel self-assembling cyclodextrin system as preventive treatment against viral infection.



Adamantane-promoted inclusion assembly of functionalised β-cyclodextrins grants protection to host cells against the infection by SARS-CoV-2.

Bibliographic references:

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