Max-Planck-Innovation

Technology Offer

Molecularly defined non-infectious synthetic virus-like particles to mimic biophysical features of natural pathogens

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A synthetic virus-like particle, comprising a lipid bilayer, that can be adjusted precisely to mimic biophysical features of various natural pathogens. The lipid bilayer can also be equipped with relevant molecules such as the SARS-CoV-2 spike protein ectodomain.

Background

The coronavirus pandemic has not only challenged healthcare systems around the globe but also intensified research in order to develop vaccines as well as antiviral therapeutic strategies. Although research publications on SARS-CoV-2 increased immensely since early in 2020, an effective therapy against COVID-19 is still not available.

Virus entry into the host cell is the critical step in viral infection and thus, many studies have focused on the interaction between the virus and certain cell surface receptors on target cells. However, studying surface receptors presents a unique set of challenges for drug discovery studies as they require a lipid environment to maintain native structure.

As current methods studying pathogen receptor interaction are slow and laborious, synthetic virus-like particles represent a non-hazardous option for investigating virus properties by mimicking biophysical features of various natural pathogens. They do not require cumbersome cell culture conditions and offer more stability, purity and less heterogeneity than membrane vesicles. However, there is a need for an improved technique to study the interaction between viruses with living cells on a molecular level with little effort.

Technology

Scientists from the Max-Planck-Institute for Medical Research have developed a synthetic virus-like particle comprising a lipid bilayer. Due to the unique production process, the synthetic lipoparticles can be adjusted precisely to mimic biophysical features of various natural pathogens. The lipid bilayer can be equipped with relevant molecules such as the SARS-CoV-2 Spike protein ectodomain which is particularly beneficial for assessing receptor binding to the cell, but can also compromise fluorophores.

Thereby, the synthetic lipoparticles allow for integrated assessment of particulate and multivalent binding effects between the pathogen and living cells without the need for high biosafety standards, facilitating production and use.

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We are now looking for either a licensing partner, or a collaboration partner to further develop this project.

Publications

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Patent Information

A priority application was filed on 30.08.2021.

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