

MIMETIC POLYPEPTIDES FOR COVID-19 PREVENTION, TREATMENT AND DIAGNOSIS

Technology for Licensing

Keywords:

SARS-CoV-2, COVID-19, mimetic polypeptide, HR1, S2, prevention, treatment, diagnostic

Description:

Coronavirus SARS-CoV-2 disease (COVID-19) has become the most severe pandemic in the last decades, causing huge human and economic losses. Despite the high research activity around it, the immunity granted by current vaccines decreases after several months, and new variants of the virus appear, escaping vaccine protection. In addition, no antiviral drugs exist to treat the infection.

Current vaccines are based in immunization with the complete inactivated virus; with the complete spike protein (S); or with the receptor binding domain (RBD), from the S1 subunit of the S protein. However, S1 regions are more variable than the S2 subunit, which is conserved even between different coronaviruses, and not many mechanisms aimed at neutralizing it are currently known.

The S2 subunit features two regions HR1 and HR2 which interact during cellular and viral membranes fusion process. This subunit is homologous to transmembrane gp41 subunit from VIH, which is already demonstrated as an effective target to neutralize this virus.

Taking advantage of that, new mimetic polypeptides from the HR1 region of the S2 subunit have been developed. Those polypeptides allow to block membrane fusion with SARS-CoV-2 by interfering in the conformational change of HR1 and HR2. These HR1 mimetic polypeptides show a high thermal stability, are highly soluble and can form high-affinity complexes with HR2. Their characteristics are ideal to prevent, treat and diagnose the infection caused by these coronavirus.

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New polypeptides to prevent, treat and diagnose SARS-CoV-2 coronavirus infection have been developed. These are short sequences that mimic fragments of the HR1 region, highly conserved, and that have a high affinity for HR2, being able to inhibit the fusion of viral and cellular membranes. They are ideal components for developing new vaccines, treatments and diagnostic methods.

Advantages and Benefits

» Long term and wide spectre immunity.

Thanks to the use of a highly conserved region both in time and between variants, there will be possible to develop new vaccines with prolonged immunity.

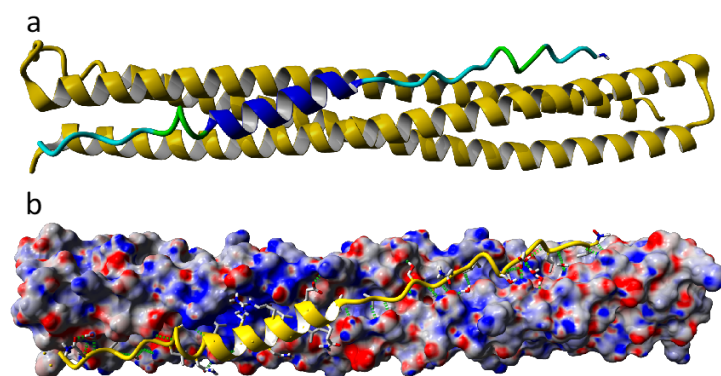
» Useful for the prevention, treatment and diagnosis.

Polypeptides can be used to make vaccines, to develop treatments that block membrane fusion, and to detect antibodies against the virus inside the organism.

» High thermal stability and high solubility of polypeptides.

» Already tested and used mechanism against virus with homologous structures,

such as VIH, against which a strong infection block is achieved through the gp41 subunit.



Schematic of HR1 mimetic polypeptides structure (a) and their interaction with HR2 (b)

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