SARS-COV-2 NEUTRALIZING MONOCLONAL ANTIBODIES AND THERAPEUTIC APPLICATION THEREOF

Introduction

The immense public health benefit brought by the unprecedented speed of effective vaccine rollout has the potential to thwart the SARS-CoV-2 pandemic. Unfortunately, no vaccine guarantees 100 % protection from infection, vaccine-induced antibody titers may wean over time, the most vulnerable groups may fail to respond to vaccination, a proportion of the population will not be vaccinated due to medical counterindications or by choice, and all of the currently available vaccines are designed to target immune response to the initial Wuhan strain of viral spike protein, which in the meantime has mutated resulting in vaccines' decreased level of protection against emerging variants. In this light, therapeutics remain a crucial tool to prevent a serious outcome of infection.

Technology

Researchers at Ghent University developed an optimized workflow to rapidly identify antibody sequences in human samples and subsequently constructed of a library that consists of anti-SARS-CoV-2 human monoclonal antibodies that bind the receptor-binding domain within the spike protein and block ACE2 binding, thereby preventing virus entry and inhibiting virus infectivity. From this pool of antibody sequences, substantial in vitro and in vivo evidence of the therapeutic potential of two antibodies (UZGENT_A3 and UZGENT_G5) was obtained, including high affinity and strong virus neutralizing activity (also against the deltavariant), and motivate further clinical development.

Applications

• Monoclonal anti-SARS-CoV-2 antibodies can be administered prophylactically, e.g. following a high risk contact or in case a local outbreak occurs, as well as therapeutically to reduce the risk of COVID-19 related hospitalisation or death.
• Monoclonal anti-SARS-CoV-2 antibodies can be particularly useful for older people, young children, and immunocompromised people for whom vaccines either do not work or can be dangerous, or if currently marketed vaccines would fail to elicit an immune response to adequately protect against infection with new SARS-CoV-2 variants that continue to arise.

Advantages

• Monoclonal antibody therapy is generally considered a safe approach.
• Monoclonal antibodies can be used in both a prophylactic and therapeutic setting and provide instantaneous protection upon administration.
• Different antibodies can be combined and administered as a cocktail to decrease the risk of escape mutants and ensure efficacy against different strains.

State of development

Our antibody formulation has completed preclinical development, including in vivo animal studies, and is ready to enter clinical evaluation in Phase I/II studies (TRL 4).

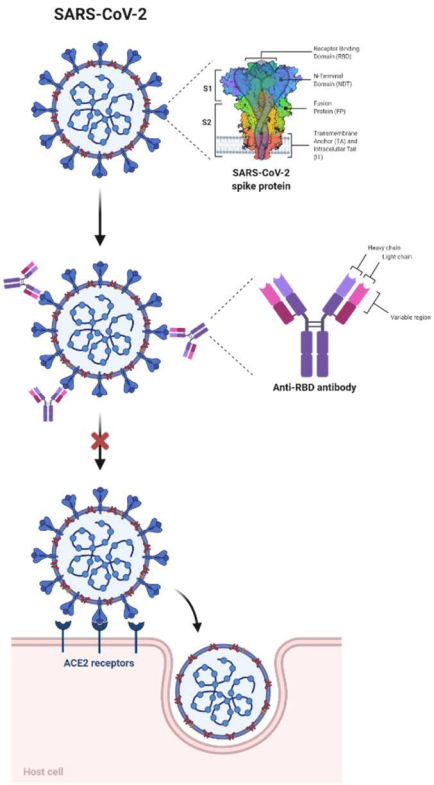
Partnership

We are currently looking for partners that are interested in the further clinical development of the antibodies. We have a preferred partner for GMP production of the antibodies and currently stable GMP CHO cell lines are under development.

Intellectual property

Patent application has been filed with the European Patent Office on 16/7/2021: EP21186206.5.

Figure



Antibody-mediated neutralization of SARS-CoV-2 through inhibition of ACE2 receptor binding

The Scientist(s) (optional)

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