

Therapeutic antibodies against SARS-CoV-2 based on camelid nanobodies

CSIC and the University of Las Palmas de Gran Canaria have developed a panel of high affinity nanobodies (Nb) binding to diverse SARS-CoV-2 RBD epitopes of spike protein, and a set of nanobody-derived neutralizing heavy chain antibodies (hcAbs) with therapeutic potential *in vivo*, as they can protect hACE2-transgenic mice after infection with a lethal dose of SARS-CoV-2.

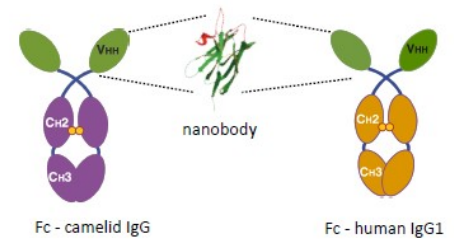
Industrial partners from biotech pharmaceutical industry are being sought to collaborate through a patent licence or co-development agreement

An offer for Patent Licensing or co-development

Neutralizing antibodies with therapeutic potential and capable of binding and neutralizing different SARS-CoV-2 variants.

The COVID-19 pandemic is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and is a major threat to global public health that has caused over 5 million deaths because of the absence of specific therapeutics. During this year, several COVID-19 vaccines based on different technologies were authorized in different countries, as well as some SARS-CoV-2 neutralizing antibodies generated from COVID-19 convalescent individuals.

Heavy chain antibodies (hcAb) derived from single variable VHH domains or Nanobodies (Nbs) naturally found in camelids (e.g., dromedaries, llamas, alpacas), hold a great potential given their unique structural, biophysical, and epitope-binding properties. So far, few studies have demonstrated *in vivo* protection of SARS-CoV-2 infection with nanobodies, and characterized their binding to circulating variants.



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Main innovations and advantages

- The invention includes a panel of nanobodies (MW \approx 14 KDa) clones and human IgG1 heavy chain Fc-fused molecules (MW \approx 80 KDa).
- The molecules have been humanized and can be expressed in mammalian-cells and purified from culture media.
- The antibodies have shown potent neutralization capacity for different SARS-CoV-2 virus variants (alpha, beta, gamma and delta).
- The monovalent molecules have very high affinity (subnanomolar range) to receptor binding domain (RBD) of spike SARS-CoV-2 protein and compete with the RBD-ACE2 human receptor interaction.
- A cocktail based on two of antibodies identified have the potential to become a new therapy against SARS-CoV-2 variants for immunocompromised or high-risk severe disease subjects.

Patent Status

Several priority patent applications filed suitable for international extension

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