

## Nanoparticles with antiviral activity against coronavirus

CSIC have found that coated iron oxide (IONPs) and iron oxyhydroxide nanoparticles (IOHNPs) can be used in the treatment and prevention of viral infections caused by Coronaviridae, especially those caused by respiratory syndrome-related coronaviruses selected from the species “Severe acute respiratory syndrome-related coronavirus” (such as SARS-CoV and SARS-CoV-2) and “Middle East respiratory syndrome-related coronavirus” (MERS-CoV). These coated nanoparticles can provide protection against coronaviruses and represent a new treatment for COVID-19 disease.

Industrial partners from the pharmaceutical industry are being sought to collaborate through a patent licence agreement.

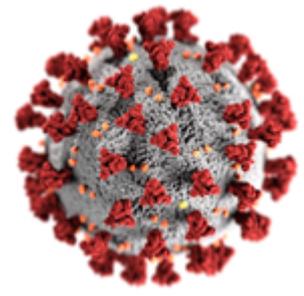
### An offer for Patent Licensing

#### Use of coated nanoparticles against SARS-CoV-2 infections

With the start of the COVID-19 pandemic, the inventors have found that IONPs and IOHNPs display antiviral activity against SARS-CoV-2 in vitro.

In addition, by coating the nanoparticles with a suitable organic compound, advantageous properties are displayed. The coating confers biocompatibility to the nanoparticle which can therefore be used at a therapeutically effective concentration in living cells without causing cytotoxicity. It also stabilizes the iron core, slowing down the release of iron, protecting the particles from further aggregation, as well as sustaining the particles in a colloidal suspension that can be intravenously injected.

Moreover, the severity of COVID-19 is negatively correlated with serum iron levels, therefore, in addition to the likely direct antiviral activity of the nanoparticles, the treatment with them could improve patient outcomes.



Coronavirus SARS-CoV-2

#### Main innovations and advantages

- The IONPs can be synthesized or, as an alternative, are commercially available and already approved by regulatory agencies as contrast agents.
- The IOHNPs can be synthesized or, as an alternative, are commercially available and already approved by regulatory agencies as antianemic drugs.
- Biocompatible coating which confers stability to the nanoparticles.
- Do not present cytotoxicity in vitro.
- In an in vitro system, the nanoparticles can efficiently impair virus replication, transcription and production of infectious virus.
- Suitable for oral, intranasal or parenteral administration in combination with a pharmaceutical carrier.

#### Patent Status

Priority patent application filed suitable for international extension

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