Researchers create a filter for masks that can deactivate SARS-CoV-2 and multi-resistant bacteria

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Credit: Asociación RUVID

Researchers from the Catholic University of Valencia (UCV), from the Biomaterials and Bioengineering group of the CITSAM (San Alberto

Magno Centre for Translational Research), headed by Ángel Serrano, have developed a protective filter with commercial tissues for masks, manufactured with a biofunctional coating of benzalkonium chloride, that can deactivate SARS-CoV-2 a minute after coming into contact with the virus.

"Masks have been globally accepted as a useful tool for preventing the viral and bacterial spreading, but the commercial ones have filters manufactured with materials that are uncapable of deactivating SARS-CoV-2 and bacteria that are multi-resistant to drugs," explains Serrano

This filter also deactivates bacteria Staphylococcus aureus and Staphylococcus epidermidis, which are resistant to the antibiotic methicillin, which worsen the pneumonia caused by the coronavirus, and which represent a threat for people's lives. This fact makes the filter created by the UCV scientists the first to deactivate SARS-CoV-2 as well as multi-resistant bacteria.

"Both symptomatic and asymptomatic individuals can infect others even if they are wearing a mask, because some viable viral or bacterial charges can escape. Furthermore, transmission by contact usually happens after touching the mask, which represents an increasing source of contaminated biological waste," explains UCH researcher Ángel Serrano.

Alongside Serrano, head researcher, the other people who have taken part in the research are the fellow members of the CITSAM group, Miguel Martí and Alberto Truñón; as well as researchers Yukiko Muramoto, Takeshi Noda and Kazuo Takayama from the University of Tokyo, Japan, and Finn Lillelund Aachmann from the Norwegian University of Science and Technology of Trondheim.

Serrano says, "Instead of pursuing economic gains," this group of

research has decided to publish the results of their study: "We believe that the most ethically appropriate thing to do was to make this known to the scientific community and the companies that manufacture masks in mass as soon as possible due to the dramatic pandemic situation we are suffering."

In a few months the masks with these new filters could be on the market at a very affordable price, because the way they are manufactured is very fast and cheap, and the key product, benzalkonium chlorite, is not expensive. "The correct use of this technology of wide anti-microbial spectrum is important for the mass production and marketing of these mask filters—says Serrano—that will be very useful for health staff and researchers who work in the urgent and challenging fight against this pandemic."

The study has been published in *bioRxiv*, a service for the filing and online distribution of the Cold Spring Harbor laboratory in New York.

More information: Miguel Martí et al. Protective face mask filter capable of inactivating SARS-CoV-2, and methicillin-resistant Staphylococcus aureus and Staphylococcus epidermidis, *bioRxiv* (2020). DOI: 10.1101/2020.11.24.396028

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