Masks for Covid with nanotechnology![1]

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We have learned the importance of using masks to stop the spread of Covid-19 infections. This is not a novelty. Masks have been used since ancient times when due to aerobic contagion and toxins in the air. The historian Pliny the Elder in the 1st century recounted that Rome artisans who prepared paint with lead (made up of lead oxides) used masks to protect themselves from toxic dust[2]. In the Middle Ages, European doctors used masks with the shape of a bird's beak to protect themselves from the bubonic plague. Another example is that of the servants of the emperor of the Chinese Yuan Dynasty, who served food using silk masks.

At the beginning of the 20th century, Doctor Wu Lien Teh became the icon of health protection by using masks in case of epidemics, having controlled the "plague of Manchuria" in the northeast of China[3].

A study carried out in Bangladesh in 2021, found a reduction of 11.2% in Covid in villages that used masks against those that did not use them regularly, which led to the conclusion that the use of masks helped reduce the symptomatic infections caused by SARS-Cov-2[4].

Everything indicates that the masks are still efficient; however, everything carries its respective risks, and it is important to inform yourself.

The prominent use of masks during the pandemic has led to the use of nanomaterials in their production[5]. The most widely used are silver oxide, copper and oxide, magnesium peroxides, zinc oxide, tungsten oxide, graphene, and various polymers and natural compounds implemented in multiple countries. However, this new technology has brought unknown risks, such as inhaling these nanoparticles as they become detached from the mask during use. Some countries have raised the alert. In France, the National Agency for Food Safety (ANSES) sent a statement on the evaluation of a brand of washable masks containing silver and copper zeolites; also in Belgium, where the National Institute of Public Health (Sciensano) mentioned the lung risk caused by thousands of masks distributed free of charge by the government by releasing nanoparticles of

[1] Translation from Spanish by Edgar Záyago Lau

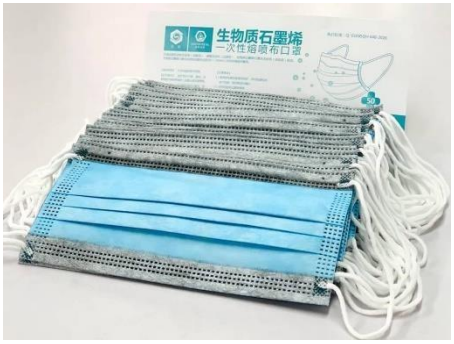
[2] https://www.globaltimes.cn/content/1179358.shtmlhttp://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Aabo%3Aphi%2C0978%2C001%3A33

[3] https://www.nytimes.com/2021/05/19/health/wu-lien-teh-china-masks.html

[4] https://www.poverty-action.org/publication/impact-community-masking-covid-19-cluster-randomized-trial-bangladesh

[5] https://pubs.rsc.org/en/content/articlelanding/2021/RA/D0RA10009A

silver and titanium dioxide during inhalation[6], likewise, this institution also adds in its last publication in October 2021 that titanium dioxide can be potentially carcinogenic in case of inhalation and reaffirms that the benefit of the use of nanoparticles in masks does not outweigh



the risk that this entails to the people who use them. In 2021 social organizations based in Canada and the United States petitioned the Environmental Protection Agency (EPA), the Federal Drug Administration (FDA), and the United States Consumer Product Safety Commission to ban imports and sale and request that masks containing graphene and/or nano copper be withdrawn from the market[7]. In Canada, the father of a schoolboy warned the country's authorities of the risk from nanographene masks; in consequence, Health Canada (the health authority) suspended the use of those masks. Countries such as Belgium, France, and Spain have withdrawn masks with this technology.

Recently, in Mexico the UNAM (National Autonomous University of Mexico) has been working on a new mask containing silver and copper nanoparticles, which, when subjected to airflow for 24 hours, showed no release of the nanoparticles. When placed in water for 24 hours, the release of those was minimal. In addition, the mask is washable up to 10 times and can be reused. It was also tested against water currents, possible penetration into the skin, and detachment by moisture[8].

[6] https://www.lemonde.fr/economie/article/2021/05/06/l-autorite-europeenne-de-securite-des-aliments-ne-considere-plus-le-dioxyde-de-titane-comme-un-additif-fiable_6079396_3234.html
[7] https://www.iatp.org/documents/us-and-canadian-groups-call-ban-face-masks-containing-toxic-nanomaterials
[8] https://www.gaceta.unam.mx/hecho-en-cu-cubrebocas-antimicrobiano/