



# Vacunas

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## Letter to the Editor

# Transmission of SARS CoV-2 virus through the ocular mucosa worth taking precautions



## Transmisión del virus del SARS CoV-2 a través de la mucosa ocular vale la pena tomar precauciones

Researchers continue to scout other transmission routes for the SARS-CoV-2, including eyes. Attaining infection of SARS-CoV-2 through the eyes is much less common than through the nose or mouth. It is usually that eye may be exposed to the transmission of the SARS-CoV-2 by touching the contaminated hand or by rubbing.<sup>1</sup>

Severe acute respiratory syndrome coronaviruses (SARS-CoV-1 and 2) are mainly transmitted through direct or indirect contact with mucous membranes (eyes, mouth, or nose). Thus exposed mucous membranes including unprotected eyes increase the risk of viral transmission, especially in healthcare workers at close contact with respiratory droplets if adequate eye protection is not used. Another less common way for transmission can occur through direct coughs or sneezes reaching unprotected eyes.

It is known that infectious droplets and body fluids can easily contaminate the epithelium of the human conjunctiva and that the respiratory virus is capable of inducing respiratory infections through this entrance.<sup>2</sup>

Last March, Dr. Wang Guangfa, a respiratory specialist at Peking University -China, was infected by the virus after coming into contact with COVID-19 patients with a disposable face mask covering his mouth and nose but without eye protection. Last March, a study found that there were no traces of SARS-CoV-2 in 64 tear samples from 17 patients in Singapore. This result pointed to a low risk of viral spread through the eyes. Since then, new case reports and studies have emerged.<sup>3</sup>

One report investigated ocular symptoms in 56 patients recruited between 19 January to 29 February 2020 that were at isolation at the Hospital of Zhejiang University, in China. Of these 15, six reported having ocular symptoms before displaying a fever or any respiratory symptoms. All patients had been recovered from COVID-19. Another study disclosed that 27% of patients had ocular symptoms, including eyesore, runny tears, itching, eye redness, and heavy ocular secretions.<sup>4</sup>

According to the statement by Dr. Joseph Fair to “NBC’s Today”, he believes that he got infected of SARS-CoV-2 through his eyes while travelling on a crowded flight, although he wore mask and gloves, and diligently whipped his seat, he didn’t have any protection over his eyes. He developed COVID-19 symptoms three or four days later although his four PCR tests for the virus were negative.<sup>5</sup>

According to a review of 172 studies analyzing data collected from 16 countries, if healthcare workers and executives wore eye shields, there is a significant protection against being infected by this virus and other respiratory pathogens. Moreover, wearing eye protection may make the transmission of COVID-19 about three times less likely, according to the study.<sup>6</sup>

Conjunctival symptoms are observed in the subset of patients with COVID-19. The virion particles were detected in tears led to raising concerns regarding tears as a portal entry. Importantly, the ocular cell surface possesses key factors required for the entry of the virions and infection. The immunohistochemical analysis exposed the expression of ACE2 in the conjunctiva, cornea, and limbus, using specifically eminent dyes in the superficial of conjunctival and corneal epithelial surface tissue. On the other hand, surgical conjunctival specimens are showed the expression of ACE2 in the conjunctival epithelium.<sup>7</sup> It is being considered that the ACE2 on the host cell works as a receptor for the SARS-CoV-2 virus. Just as the early reports confirmed TMPRSS2, as the cell protease that facilitates viral entry following binding spike protein of SARS-CoV-2’s to ACE2. These signs have been found in the cornea, eyelid, and the eye sclera of the participants implicated in the analysis. This discovery not only explains the high transmission rates among healthcare workers, but it also explains the conjunctivitis symptoms reported by a sizable portion of carriers.<sup>8</sup>

Our tears are known to contain antibodies to help to detect and to stick harm antigens such as bacteria and viruses. Currently, findings show a potential pathway for the entry of and

infection with SARS-CoV-2 in human ocular tissue that could spark research into the importance of this route of spread.<sup>9</sup>

A review study addressed using eye protection equipment to reduce the spread of droplets and aerosols across eye transmission of respiratory syncytial virus (RSV) infection. Moreover, some studies used some personal protective equipment including masks, gowns, gloves, and goggles.<sup>10</sup> Two systematic studies found that using eye and nose goggles protection is effective in preventing transmission to employees for employees. The WHO has conducted technical specifications for these items, based on imitation exercises using data from previous SARS and MERS outbreaks.<sup>11</sup>

The small sample size has been a warning in several published scientific studies related to eye symptoms in patients with SARS-CoV-2. The use of eye goggles, visors, and face shields, may reduce infection rates for health care workers, in addition to social distancing, hand-washing and wearing face masks.<sup>12</sup>

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## Funding

None.

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## Conflict of interest

The author declares that there is no conflict of interest of this manuscript.

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## Acknowledgments

The author thanks the University of Mosul for documenting this work.

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<https://doi.org/10.1016/j.vacun.2020.09.003>