



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

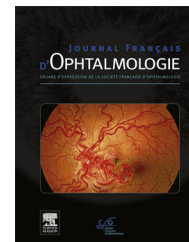


Disponible en ligne sur

ScienceDirect
www.sciencedirect.com

Elsevier Masson France

EM|consulte
www.em-consulte.com



LETTER TO THE EDITOR

Possible protective role of contact lens against SARS COV 2



Les lentilles de contact et leur rôle protecteur contre le SARS COV 2

Dear Editor,

We would like to propose a possible mechanism of protection by the use of contact lenses.

It is known that conjunctiva may be an entry point for SARS-COV-2 to infect respiratory tract [1]. Contact lenses cover the greater extent of the exposed to droplets ocular surface, and in conjugation with the antiviral properties of the tear film, they could considerably limit the danger of conjunctivitis. The tear film has antiviral properties, for instance contains the protein lactoferrin, and it is plausible that could inactivate viruses that were to come in contact with the tears. Therefore may prohibit viral entry into ocular surface cells [2].

Specifically, lenses could act as a protection shield against the inoculation of the SARS-COV-2 to the conjunctiva. Their protective role, even if some conjunctival areas remain uncovered, may be of essential value as cornea, rather than conjunctiva has higher potential to be infected by SARS-CoV-2. The expression of both ACE2 and TMPRSS2 receptors, which mediate the viral entry in mucosa cells, is much higher in cornea rather than in conjunctiva cells, suggesting that conjunctiva would be less likely to be infected by SARS-CoV-2. Subsequently viral reproduction in ocular surface cells could be prevented as the ensuing spread of a great load of new viruses to nasal and nasopharyngeal mucosa by tears inducing a respiratory tract infection [1,3].

Possible adhesion of the SARS-COV-2 on the surface of certain contact lenses, depending on their manufacturing process, may retard the transfer of viruses from the contact lenses, further diminishing the viral load. Transfer of virus would be influenced by the strength of adhesion to both moulds and lenses, as well as the effect, if any, of tears. Even though there have been no evidence available on the

ability of coronaviruses to adhere to the main materials of contact lenses, some of the commonest materials used in the molding process, such as polypropylene and polyoxymethylene, could bind SARS-COV-2 [2,4]. The interaction between the mold surface and polymer solution will affect the surface finish of the contact lens and molding material may remain on the surface of contact lenses after the production process as mutual mass transfer takes place at the lens-mold phase boundary. The adhering mass particles cannot be separated from the lens even after washing for several days [5,6].

Author contributions

Plotas P and Kagkellaris K contributed equally to the manuscript as co-first author.

Role of the funder/sponsor

None of the funders had a role in the preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Disclosure of interest

The authors declare that they have no competing interest.

References

- [1] Sun C, Wang Y, Liu G, Liu Z. Role of the eye in transmitting human coronavirus: what we know and what we do not know. *Front* 2020, <http://dx.doi.org/10.3389/fpubh.2020.00155>.
- [2] Jones L, Walsh K, Willcox M, Morgan P, Nichols J. The COVID-19 pandemic: important considerations for contact lens practitioners. *Contact Lens Anterior Eye* 2020;43:196–203.
- [3] Ma D, Chen C-B, Jhanji V, Xu C, Yuan X-L, Liang J-J, et al. Expression of SARS-CoV-2 receptor ACE2 and TMPRSS2 in human primary conjunctival and pterygium cell lines and in mouse cornea. *Eye (Lond)* 2020:1–8.
- [4] Guo Z-D, Wang Z-Y, Zhang S-F, Li X, Li L, Li C, et al. Aerosol and surface distribution of severe acute respiratory syndrome Coronavirus 2 in hospital wards, Wuhan, China, 2020. *Emerg Infect Dis* 2020;26:26, <http://dx.doi.org/10.3201/eid2607.200885>.
- [5] Musgrave CSA, Fang F. Contact lens materials: a materials science perspective. *Materials* 2019;12:261.

- [6] Lukás J, Fenclová T, Tyrácková V, Vacík J. The surface treatment of polypropylene molds and its effect on the quality of cast contact lenses. *J Appl Biomater* 1992;3:275–9, <http://dx.doi.org/10.1002/jab.770030406>.

P. Plotas^a, K. Kagkellaris^a,
A. Konstantopoulou^b, O. Makri^a,
C.D. Georgakopoulos^{a,*}

^a *Department of Ophthalmology, School of Medicine, University of Patras, Patras, Greece*

^b *Department of Materials Science, University of Patras, 26504 Patras, Greece*

* Corresponding author.

E-mail address: cgeorg@upatras.gr

(C.D. Georgakopoulos)

Received 16 May 2020;

accepted 18 May 2020

Available online 6 June 2020

<https://doi.org/10.1016/j.jfo.2020.05.004>

0181-5512/© 2020 Published by Elsevier Masson SAS.