

Physiological plausibility of lower viral load in patients with COVID-19 and olfactory/gustatory dysfunction

To the Editor,

We read with interest the retrospective cohort study reported by Taziki Balajelini et al.,¹ which investigated the relationship between viral load and the incidences of olfactory dysfunction (OD) and gustatory dysfunction (GD) in patients with COVID-19. In the study, the authors observed a significantly higher ($p=0.001$) mean cycle threshold (Ct) value of RT-PCR test for SARS-CoV-2 among patients with (28.13 ± 4.55) OD compared to their counterparts without OD (26.91 ± 4.49). The Ct values of the RT-PCR test for SARS-CoV-2 correlate inversely with the viral load, where low Ct values indicate high viral loads and vice versa; therefore, the findings of the study suggest a lower viral load in patients with OD. A similar pattern was observed in patients with GD, where the mean Ct value was significantly higher ($p=0.002$) in patients with GD (28.16 ± 4.52) compared to patients without GD (27.01 ± 4.52).

The findings of the study may be counterintuitive to many since increased viral load would be expected to lead to more widespread damage to the olfactory and gustatory epithelium. Nevertheless, the observations coincide with the findings of a meta-analysis² in which severely ill patients with COVID-19 had a lower odd of experiencing OD than non-severely ill patients with COVID-19 (odds ratio=0.527; 95% confidence interval 0.373–0.744); the viral loads have been associated directly with disease severity in patients with COVID-19, and therefore, patients with OD and/or GD who had a low viral load (as reported in the study¹) would be expected to experience milder illness.³

While the authors have attempted to explain their novel observations (utilisation of detergents, presence of ACE2 receptors in the olfactory epithelium, and early referral of patients with OD and/or GD), we would like to supplement the physiological plausibility of their findings. In patients with COVID-19, viral invasion can cause damage to the olfactory and gustatory epithelium, leading to OD and/or GD. Noteworthy, due to verbal confusion and non-testing of explicit gustatory and olfactory testing, both OD and GD could actually be the same disorder.⁴ This process acts as a defence mechanism since it could trigger the innate immune response, which destroys the virus and limit viral propagation to the lower respiratory tract, thereby a low viral load.⁵ Yet, the implication of these novel findings has not been discussed by the authors; perhaps, the presence of OD and/or GD can be used to triage the level of care in patients with COVID-19 where patients with OD and/or GD without warning signs can receive outpatient therapy (they are also less likely to infect others due to lower viral load) since they are less likely to deteriorate clinically.

KEYWORDS

coronavirus, gustatory, olfactory, smell loss, taste loss

FUNDING INFORMATION

None.

ACKNOWLEDGEMENTS

N/A.

CONFLICT OF INTEREST

All authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS


CSK drafted, revised and approved the manuscript. CSK, DSR and SSH revised and approved the manuscript. CSK agree to be accountable for all aspects of the work.

ETHICAL APPROVAL

N/A.

DATA AVAILABILITY STATEMENT

N/A.

Chia Siang Kow^{1,2} 
Dinesh Sangarran Ramachandram²
Syed Shahzad Hasan^{3,4}

¹School of Postgraduate Studies, International Medical University, Kuala Lumpur, Malaysia

²School of Pharmacy, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia

³School of Applied Sciences, University of Huddersfield, Huddersfield, UK

⁴School of Biomedical Sciences & Pharmacy, University of Newcastle, Callaghan, Australia

Correspondence

Chia Siang Kow, School of Postgraduate Studies, International Medical University, Kuala Lumpur, Malaysia.
Email: chiasiang_93@hotmail.com

ORCID

Chia Siang Kow  <https://orcid.org/0000-0002-8186-2926>

REFERENCES

1. Taziki Balajelini MH, Rajabi A, Mohammadi M, et al. Virus load and incidence of olfactory, gustatory, respiratory, gastrointestinal disorders in COVID-19 patients: a retrospective cohort study. *Clin Otolaryngol.* 2021;46(6):1331-1338. doi:10.1111/coa.13844. [published online ahead of print, 2021 Aug 6].
2. Purja S, Shin H, Lee JY, Kim E. Is loss of smell an early predictor of COVID-19 severity: a systematic review and meta-analysis. *Arch Pharm Res.* 2021;44(7):725-740.
3. Fajnzylber J, Regan J, Coxen K, et al. SARS-CoV-2 viral load is associated with increased disease severity and mortality. *Nat Commun.* 2020;11(1):5493.
4. Hummel T, Heilmann S, Landis BN, et al. Perceptual differences between chemical stimuli presented through the ortho-or retronasal route. *Flavour Fragr J.* 2006;21(1):42-47.
5. Rodriguez S, Cao L, Rickenbacher GT, et al. Innate immune signaling in the olfactory epithelium reduces odorant receptor levels: modeling transient smell loss in COVID-19 patients. *medRxiv.* 2020. Preprint. 2020.06.14.20131128.

How to cite this article: Kow CS, Ramachandram DS, Hasan SS. Physiological plausibility of lower viral load in patients with COVID-19 and olfactory/gustatory dysfunction. *Clin Otolaryngol.* 2022;47:397-398. doi:[10.1111/coa.13892](https://doi.org/10.1111/coa.13892)